# DEPARTMENT OF ENVIRONMENTAL QUALITY
# WEST CENTRAL REGIONAL OFFICE

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SUBJECT: New River PCB Source Identification
Sample Collections and Analytical Results

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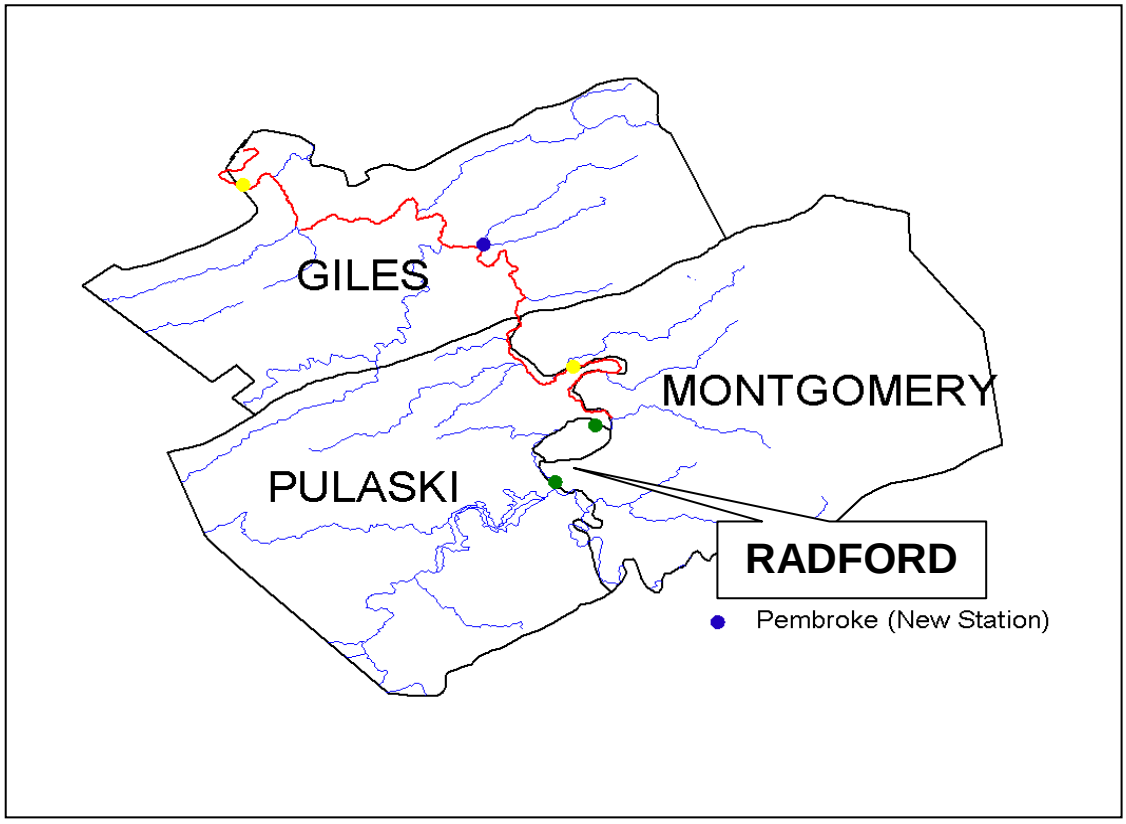
## Introduction

The purpose of the "New River PCB Source Investigation" was to identify, to the extent possible, potential or actual sources of the polychlorinated biphenyls (PCBs) in the lower portion of the New River in Virginia. The investigation was initiated because on August 6, 2001, the Virginia Department of Health (VDH) issued a fish consumption advisory for carp taken from the New River based upon finding PCBs in fish tissue. The advisory area extends from the Route 114 bridge (Peppers Ferry Boulevard) just north of Radford to the Virginia-West Virginia State line near Glen Lyn, Virginia. The red line shown below approximates the extent of the fish consumption advisory on New River.



Based on these findings and the posting of the fish consumption advisory, DEQ initiated the "New River PCB Source Investigation" project in accordance with DEQ's Toxic Contamination Source Assessment Policy (TCSAP, Jan. 5, 2000). Summaries of fish tissue and sediment PCB data are included in **Attachment A**. Project deliverables specified in the investigation work plan that are not included in the text of this report are contained in the enclosed compact disc.

## Organization

The New River PCB Source Search Citizen's Committee (Committee) was formed to advise DEQ about the direction and substance of its investigation, to serve as a forum for communicating information to the public, and to provide local information and perspectives important to the success of the project. A list of Committee members is provided in **Attachment A**. Committee members live and work in the affected advisory area, and have a personal and/or professional interest in water quality in the New River. The Committee was the primary conduit through which DEQ communicated with the public. DEQ met with Committee members on six occasions between April 25, 2002, and May 27, 2004. All meetings were open to the public and were advertised in the local newspaper, the Virginia Register, and via paper and electronic mailings. The Virginia Department of Game and Inland Fisheries and Virginia Department of Health were also advised of all meetings. Copies of presentations to the Committee are contained in the enclosed compact disc.

In order to identify potential PCB sources in the New River, industrial facilities that may have used or stored PCB containing substances were identified by DEQ. The potential to have used or stored PCBs was determined based on reviewing agency records, historical information, and pre-existing analytical data, discussing facilities with Committee members, and interviewing representatives of industrial and municipal facilities. Soil and sediment samples were collected from industrial and municipal facilities that were determined to have used or stored PCBs historically and had a potential to release PCBs to the New River or tributaries of New River. Facilities selected for sampling, and proposed sample areas, were reviewed with the Committee.

The determination that a facility used or stored PCBs was made through a multi-step process. The first step was to define the universe of facilities that operated currently or historically within the New River watershed downstream of the Claytor Lake Dam. In order to generate a comprehensive facility list, multi-system data queries were performed based on geographic locations (county, water body identification, zip code, etc.) for air, water, solid waste, hazardous material, petroleum storage, Virginia Voluntary Remediation Program (VRP), and tire disposal sites. The sources for these queries are listed in **Attachment A**. Facility lists for each media and facility type were created and maintained. Following initial list development, file searches of agency records were performed to determine the facility location, type of industrial operation, and other relevant site-specific information. The initial facility list contained approximately 1,350 facilities.

Due to the large number of facilities initially inventoried, it was necessary to develop criteria that could be applied to the list in order to focus search efforts on the more probable PCB sources. Primary screening criteria were as follows: the facility was not a school, the facility operated prior to 1980, the facility was located within the study watershed, and facility operations included either hazardous materials handling, oil distribution, landfill operation, waste oil storage, or wastewater treatment capacity exceeding 1.0 million gallons per day. Tire piles were also maintained on the list at this stage. Facilities that did not meet a potential PCB source criteria were removed from the list. **Attachment A**, Flowchart 1, depicts these screening criteria in flowchart form. Approximately 335 facilities remained on the potential PCB source list after this initial "desktop" screening.

Due to the large number of facilities still remaining for evaluation, a second set of screening criteria were applied to further focus search efforts. Secondary screening criteria were as follows: the facility was a tire pile, a petroleum underground storage tank facility with no other industrial operations, a hospital, a sewage pump station, a concrete plant, an asphalt plant, or a major municipal wastewater treatment plant with no industrial contributions. These types of facilities were removed from the potential source list. In addition, registration records for hazardous material handlers were reviewed and registrants handling inorganic materials were removed from the list. Finally, single media facility records were reviewed in greater detail. Facilities with operations that did not include processes involving PCB use or storage were removed from the list. **Attachment A**, Flowchart 2, depicts this screening process in flowchart form. Approximately 80 facilities remained on the potential PCB source list after this second round of "desktop" screening.

The New River PCB Source Investigation Survey, included in **Attachment A,** was mailed to the 80 facilities remaining on the potential source list. The survey results were reviewed, and in combination with 60 telephone interviews and 48 facility inspections, 18 facilities and 2 streams were selected for on-site soil and/or sediment sampling. Facilities finally selected for sampling are identified in Table 1. Table 1 lists the facility name, site location, and number/type of samples collected at each facility. Locations of facilities are also depicted in **Attachment B**, Figure 1.

**Table 1. PCB Sampling Sites**

| Site Location | Site Identification | Number of Samples | Type of Sample |
|---|---|---|---|
| Narrows | Celanese Acetate | 6 | soil/sediment |
| Ripplemead | Chemical Lime | 5 | soil/sediment |
| Glen Lyn | AEP | 5 | soil/sediment |
| Radford | Intermet | 6 | soil/sediment |
| Radford | City storage yard | 1 | sediment |
| Narrows | SEMCO/Railroad Power Plant | 3 | sediment |
| Pembroke | Patrick Enterprises | 1 | soil/sediment |
| Radford | Radford Army Ammunition Plant | 7 | soil/sediment |
| Radford | AEP Claytor Hydro Dam | 1 | soil/sediment |
| Radford | Quarry near Claytor Hydro Dam | 1 | soil/sediment |
| Radford | Radford University | 1 | soil/sediment |
| Pearisburg | Former New River Tannery | 3 | soil/sediment |
| Giles County | Big Walker Creek | 2 | sediment |
| Giles County | Sugar Run | 1 | sediment |
| Blacksburg | Corning | 1 | sediment |
| Christiansburg | UT, Crab Creek | 1 | sediment |
| Giles County | Cloyds Mt. LF | 1 | sediment |
| Blacksburg | VT Duck Pond | 1 | sediment |
| | **Total Samples** | **47** | |

## Sampling and Analytical Approach

Samples collected for analysis were a composite of the first 6 inches of soil or sediment. Samples were collected by DEQ-WCRO's Regional Biologist, Dr. Lawrence Willis, with assistance from DEQ staff, including Gary Phillips, Mike Asma, Jay Roberts, or Gary Du. Soil samples were collected in areas where PCBs had previously been released or where visible oil stains were present on the ground surface in the vicinity of former operations involving PCBs. Sediment samples were collected at the downstream end of stormwater outfalls or ditch outlets. Four samples represent a composite of stream sediments. Soil and sediment samples were sent to the Virginia Institute of Marine Science, College of William and Mary (VIMS), for analysis. Collection, preservation, holding and extraction time requirements specified for PCBs in the EPA publication SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, were maintained.

VIMS generally followed the approach in "Analytical Protocol for Hazardous Organic Chemicals in Environmental Samples" to analyze PCBs (2nd edition, 1991). Basically, PCBs were detected by gas chromatography (GC) with electrolytic conductivity detection (ECLD) in the halogen selective mode. Low resolution selected ion monitoring mass spectrometry was used to determine levels of potentially interfering chlorinated pesticides and polybrominated diphenyl ethers (PBDEs). PCB results were provided as individual congeners and total PCBs, corrected for surrogate PCB recovery (i.e. PCB204). The PCB list is more extensive than that covered under EPA Method 8082 and avoids problems associated with environmental modification Aroclor composition.

Samples were subjected to enhanced solvent extraction using methylene chloride. Multiple surrogate standards are added prior to sample extraction to span the anticipated molecular weight range of the PCBs (PCB30, PCB65, PCB121 and PCB204). Size exclusion chromatography (SEC) purification of extracts was done on an Envirosep HPLC column using methylene chloride at 5 milliliters (ml) per minute. Polarity separation of SEC extracts is conducted on 2000-mg silica gel solid phase extraction columns. Extracts are separated into two silica-derived fractions. The first fraction, eluted with 5 ml 100% hexane, contains aliphatics and is not further processed. The second silica gel fraction, eluted with 6 ml 60:40 hexane/methylene chloride, contains PCBs, organochlorine pesticides, and PBDEs.

The second silica fraction is analyzed by GC with ELCD in the halogen selective mode for halogenated analytes and GC/MS (Saturn 4D ion trap) in the selected ion mode (SIM) for selected possible co-eluting halogenated analytes. Immediately prior to this step, the internal standard pentachlorobenzene is added to the GC vials. Organochlorine compound identifications are primarily provided via halogen retention indices. All GC work is done on 60 m DB-5 columns, 0.32 millimeters internal diameter and 0.25 micrometer film thickness, using splitless injection and helium carrier gas.

Quality control measures include processing of blanks, consisting of pre-ignited sodium sulfate, with each set of samples. Each sample was also spiked with the PCB surrogate standards. The majority of chlorinated analytes elute between PCB121 and PCB204 and had intermediate volatility, leaning towards that of PCB204. Thus, correction of results with the PCB204 surrogate yields the most accurate, albeit still modestly conservative corrected results.

All data are reported as "Total PCBs." Note that Total PCB results obtained with analytical methods used in this investigation are typically somewhat higher than results obtained with Method 8082. Note sample results indicating a PCB level > 50 parts per million (ppm), was immediately reported to EPA for further assessment under the Toxic Substances Control Act. Also note that in order to convert concentrations from parts per billion (ppb) to ppm, divide by 1,000 (e.g., 50,000 ppb = 50 ppm).

## Facility Description and Sample Results

Following are brief descriptions of each of the facilities selected for on-site sampling, a discussion of activities involving use of PCBs, and any reported PCB releases. Included with the facility information is a table of sample location descriptions and PCB analytical results. The relative location of each facility in the study area is depicted in **Attachment B**, Figure 1.

### Celanese Acetate, LLC, (Celco), Narrows, Virginia

Operations at the Celco Plant began in approximately 1939 and include the production of acetate flake and fiber and steam electric power production. Reported past or present PCB uses at the site includes dielectric fluids in capacitors and transformers. Surplus PCB oil drums were stored in the maintenance building.

Two PCB spills have been reported to EPA in the past and cleaned up to required levels. The first reported release involved a transformer leak in the Transformer Room in Building 2. The Transformer Room spill in Building 2 was Aroclor 1260 and the release occurred over an extended period of time. The oil tested on the floor of the Transformer Room contained of 31,000 ppm PCBs. The spill occurred in a predominately paved area and cleanup involved removal and/or pavement cleaning. The second reported release, the "1987 PCB Incident," was a spill of approximately 100 gallons of 700,000 ppm Aroclor 1260. The "1987 PCB Incident" was caught immediately. Again, the spill occurred over predominantly paved area and the cleanup involved removal and/or cleaning of the pavement.

Concentrations of PCBs (<1 ppm) have been detected in the Closed Process Sludge Landfill (CPSL). Other landfills are located at the site include "Area A", a general RCRA D landfill that accepts non-hazardous waste and is active, and "Area B", a flyash landfill. Other landfill areas are located in the vicinity of Areas A and B. They include the former "Virginian Electric Railroad" disposal area and an "oil disposal pit." The "oil disposal pit" was reportedly used to dispose of waste oil and other chemicals, including solvents.

The Celco facility and soil/sediment sample locations and associated PCB concentrations (ppm) are depicted in **Attachment B**, Figures 2a and 2b. Sample PCB concentrations and location descriptions are also presented below in Table 2.

**Table 2. Celanese Acetate Soil/Sediment Sample Descriptions**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS007 | 9-CELCO-1 | 74.9 | Sediment from Outfall 004 (area drains Area A of the landfill) |
| 3NS008 | 9-CELCO-2 | 1,242 | Sediment from a storm drain in the area of the "1987 PCB Incident" |
| 3NS009 | 9-CELCO-3 | 9.56 | Sediment from retention basin prior to Outfall 005 (drains Area D of the landfill) |
| 3NS010 | 9-CELCO-4 | 3.29 | Soil/sediment from the drainage pathway of the CPSL |
| 3NS011 | 9-CELCO-5 | 737 | Soil/sediment from the drainage pathway of the eastern portion of Area A (culvert on the landfill road) |
| 3NS012 | 9-CELCO-6 | 37.9 | Sediment from Outfall 001 |

**Chemical Lime, Ripplemead, Virginia**

Recent sediment and fish tissue sample results from the mouth of Stony Creek at Norcross, Virginia, indicate a potential upstream source of PCBs. Chemical Lime consists of two facilities, Plant 1 and 2, located adjacent to Stony Creek, a tributary to the New River. Operations at the Plants began in approximately 1920 and included the mining of lime. Reported past/present PCB use at the sites is dielectric fluid in capacitors and transformers. PCBs were reportedly used at the sites from approximately 1940 to the present. Transformers were located in the production areas and in the mines.

Two PCB spills at the sites have been reported. At Plant 2, some transformers were stored on the ground in the northeastern portion of the site. These transformers were moved to the transformer/oil storage building in July, 2002, and shortly thereafter the transformers leaked. The PCB concentration of the spilled oil was <1 ppm and its cleanup is documented in the VPDES permit file. At Plant 1 leaks were discovered in 1986 and 1989 at the main substation. The concentration of PCB oil released is unknown. During the site visit, the facility shared analytical results for PCBs in sediment (all were < 1 ppm) from the mine sump at Plant 1. The mine sump water is discharged through process wastewater Outfall 001.

The Chemical Lime facility and soil/sediment locations and associated PCB concentrations (in ppm) are depicted in **Attachment B**, Figures 3a and 3b. Sample location descriptions and associated PCB concentrations are also presented below in Table 3. Note that samples 1, 2 and 3 were collected at Plant 1, and samples 4 and 5 were collected at Plant 2.

**Table 3. Chemical Lime Soil/Sediment Sample Descriptions**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS001 | 9-CLC-1 | 83.4 | Sediment from the former mine dewater ditch (former Outfall 001) |
| 3NS002 | 9-CLC-2 | 68.2 | Soil/sediment from retention basin that collects runoff from the area draining the "Oil Shed" |
| 3NS003 | 9-CLC-3 | 12.3 | Sediment from the former mine dewater and current site runoff ditch |
| 3NS004 | 9-CLC-4 | 4.04 | Sediment from the current site runoff ditch |
| 3NS005 | 9-CLC-5 | 7.74 | Soil/sediment from the former mine dewatering outfall at Site 2 |

**American Electric Power (AEP), Glen Lyn, Virginia**

Electric power production at the AEP Plant began in approximately 1919. Reported past and present PCB uses at the site is dielectric fluids in capacitors and transformers. Also, < 50 ppm PCB waste oil was burned in oil fired boilers. A transformer oil filtering system was formerly located at the facility. The system cycled the oil from the transformers through a central filter located in the filter press building. The oil transfer pipes are still located underground, and pipe inlets and outlets for the system are cutoff aboveground and still visible. An oil stain is located at the base of one of the capped inlets, indicating that oil may have leaked from the pipe. Five PCB releases were reported by the facility between 1991 and 1993, and in each case the released fluid was reported to contain < 150 ppm PCBs. Documentation associated with the releases is contained in the New River PCB file.

The AEP Glen Lyn facility and soil/sediment locations and associated PCB concentrations (in ppm) are depicted in **Attachment B**, Figures 4a and 4b. Sample location descriptions and associated PCB concentrations are also presented below in Table 4. The transformer oil recycling line soil sample datum indicates further investigation of the system may be warranted.

**Table 4. AEP Glen Lyn Soil/Sediment Sample Descriptions**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS018 | 9-AEP-1 | 973 | Sediment from the drainage trench located adjacent to the main building |
| 3NS035 | 9-AEP-2 | 47,707 | Soil from the area adjacent to the transformer oil recycling lines |
| 3NS020 | 9-AEP-3 | 1,043 | Soil from the area of the filter press building |
| 3NS021 | 9-AEP-4 | 63.9 | Sediment from the storm water outfall (Outfall 001) that drains the plant area |
| 3NS022 | 9-AEP-5 | 65.1 | Sediment from Outfall 004 |

## Intermet, Radford, Virginia

Operations began at the facility in 1896 while owned by Virginia Iron Coal and Coke Company. Past PCB uses at the site are dielectric fluid in capacitors and transformers, light ballasts for fluorescent fixtures, hydraulic oil in the molten steel pouring process, and fluid in the rectifier. There is documentation of a minor PCB spill of less than two gallons in 1978 due to a faulty capacitor. The "Monsanto list" indicates that the Lynchburg Foundry, one of the former owners of the facility, was a relatively large purchaser of Pydraul F-9A, a PCB containing hydraulic oil. The Monsanto list indicates purchases of 5,790 pounds in 1970, 7,110 pounds in 1971, and 2,180 pounds in 1972.

The Intermet facility and soil/sediment sample locations and associated PCB concentrations (in ppm) are depicted in **Attachment B**, Figure 5. Sample location descriptions and associated PCB concentrations are also presented below in Table 5. The 9-Intermet-4 datum indicates some potential for historical PCB discharges from the outfall.

**Table 5. Intermet Soil/Sediment Sample Descriptions**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS036 | 9-Intermet-1 | 11,496 | Soil from drain and vicinity of former pipeshop |
| 3NS014 | 9-Intermet-2 | 106 | Sediment from historical process water outfall near settling basins |
| 3NS015 | 9-Intermet-3 | 4.34 | Sediment from former process water outfall in western portion of the plant |
| 3NS034 | 9-Intermet-4 | 32,558 | Sediment from historical process water outfall (pipe) located in the central portion of the plant and adjacent to the New River |
| 3NS017 | 9-Intermet-5 | 619 | Sediment from a current Outfall 003 |
| 3NS039R | 9-Intermet-6 | 3,063 (estimated) | Sediment from Inlet to settling pond |

**City of Radford, Connellys Run, Radford, Virginia**

Connellys Run receives runoff from the City of Radford transformer storage area. Approximately 25 non-PBC transformers were stored at the facility when sampled by DEQ staff on August 18, 2003. Oil stains in the area indicate that there is potential that transformers are currently leaking or have leaked in the past. Radford also owns an incinerator that is located on the same property and an unlined landfill which is located on the opposite side of Connellys Run from the storage area. This was a facility recommended for sampling by members of the Committee.

The Radford storage area and sediment sampling location and associated PCB concentration (ppm) is depicted in **Attachment B**, Figure 6. The sample location description and associated PCB concentration is also presented below in Table 6.

**Table 6. Radford Transformer Laydown Yard/Landfill Area Sediment Sample Description**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS028 | 9-RC-1 | 2.16 | Sediment from Connellys run below transformer storage area |

**Southern Electric and Machine Company (SEMCO), Formerly Virginian Railroad Power Plant, Narrows, Virginia**

The former Virginian Railroad power plant was located adjacent to the current SEMCO plant in Narrows. The power plant provided electricity for an electric railroad that operated from approximately 1925 to 1965. Potential PCB uses at the site were in capacitors and transformers. In 1965, the plant was partially demolished, however remnants of the plant remain on site, but no transformers were observed on-site. This was a facility recommended for sampling by the Committee, specifically the former railroad power plant.

The SEMCO/Power Plant and sediment sampling locations and associated PCB concentrations (ppm) are depicted in **Attachment B,** Figure 7. The sample location descriptions and associated PCB concentrations are also presented below in Table 7.

**Table 7. Former Virginian Railroad Power Plant/SEMCO Soil/Sediment Sample Descriptions**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS024 | 9-Semco-1 | 219 | Sediment from storm water outfall draining the northern area of the former Power Plant |
| 3NS025 | 9-Semco-2 | 33.1 | Sediment from historical outfall of Power Plant |
| 3NS026 | 9-Semco-3 | 9.02 | Sediment from storm water outfall draining the southern area of the former Power Plant |

**Patrick Enterprises, Doe Creek, Pembroke, Virginia**

The building currently occupied by Patrick Enterprises was constructed in 1965. At that time, the building was occupied by dye manufacturer operating under the name Machine Design. In the early 1970's, Machine Design changed its name to PEMCO and began repairing transformers for mining operations. This operation lasted till the mid-70's, when it was sold to Fairchild's, which also did machine and repair work on transformers and other electrical equipment for mining operations until 1985. In 1985, the plant was sold to Patrick Enterprises. Patrick Enterprises machines parts for industries in the area. Potential PCB uses at the site are in capacitors and transformers.

The Patrick Enterprises sample was obtained from sediment in Doe Creek. The sediment sample location and associated PCB concentration (ppm) is depicted in **Attachment B,** Figure 8. The sample location description and associated PCB concentration is also presented below in Table 8.

**Table 8. Patrick Enterprises/Doe Creek Sediment Sample Description**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS0027 | 9-PE-1 | 5.91 | Sediment from storm water outfall from plant into Doe Creek |

**Radford Army Ammunition Plant, Radford, Virginia**

The Radford Army Ammunition Plant (RAPP) is an extensive industrial complex with several different operations. The facility contains two power plants, however only one is operational at this time. The facility is sampling its Solid Waste Management Units (SWMU) in connection with a federal facility Installation Restoration Program (IRP) initiative.

The "Monsanto list" indicates that Hercules, Inc., the former operator of the facility, purchased the following quantities of PCB containing hydraulic oils in the years 1970–73: 1,207 pounds of Pydraul F-9A, 141 pounds of Pydraul 150A, 2,100 pounds of Pydraul 230, and 1,020 pounds of Pydraul 230-A. Facility personnel indicated that the only known use of PCB hydraulic oil was in the hydraulics of powerline repair trucks. Other PCB uses at the site were in transformers and capacitors.

The RAAP soil and sediment locations and associated PCB concentrations (ppm) are depicted in **Attachment B,** Figure 9. Sample location descriptions and associated PCB concentrations are also presented below in Table 9. Somewhat elevated levels of PCBs were noted in samples 1 through 4. The addition of total PCB as an analyte in the IRP investigation may be warranted to verify PCBs were not historically disposed of in SWMUs.

**Table 9. RAAP Soil/Sediment Sample Descriptions**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS043 | 9-RAAP-1 | 8,486 | Soil collected around and adjacent to Building 3904 |
| 3NS044 | 9-RAAP-2 | 7,970 | Sediment collected downstream of Outfalls 004 and 013 adjacent to Stroubles Creek |
| 3NS045 | 9-RAAP-3 | 10,330 | Sediment from Power House sump |
| 3NS046r | 9-RAAP-4 | 17,749 | Soil/sediment from area around the compressor house |
| 3NS047 | 9-RAAP-5 | 1,563 | Sediment from Waste Incinerator Outfall |
| 3NS048 | 9-RAAP-6 | 331 | Sediment from Outfall 3E, oil storage area |
| 3NS049 | 9-RAAP-7 | 679 | Sediment from Outfall 2A |

**AEP Claytor Lake Hydro Dam, Pulaski County, Virginia**

The Claytor Lake Hydroelectric Dam was built in 1939. A transformer pad containing several large transformers is located on the property. PCB uses at the site are in transformers and capacitors.

The AEP Claytor Lake Hydro Dam soil/sediment sample location and associated PCB concentration (ppm) is depicted in **Attachment B**, Figure 10. The soil/sediment sample location description is also presented below in Table 10.

**Table 10. AEP Claytor Lake Hydro Dam Soil/Sediment Sample Description**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS037 | 9-AEP1@Claytor | 509 | Soil/sediment from bank below Dam |

**Radford University, Former Creosote Plant, Radford, Virginia**

Radford University acquired a parcel of property located adjacent to, and west of, what is now the Facilities Management Building. This property was formerly owned by Norfolk and Western Railroad and was the site of a Creosote Plant. The plant was in operation from approximately 1920 to 1957, when it was damaged by an explosion. This plant housed a small power plant and a transformer pad. The area around the creosote plant and power plant was sampled for potential presence of PCBs. This was a facility recommended for sampling by members of the Committee.

The Radford University soil/sediment sample location and associated PCB concentration (ppm) is depicted in **Attachment B**, Figure 11. The sample location description and associated PCB concentration is also presented below in Table 11.

**Table 11. Radford University Soil/Sediment Sample Description**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS029 | 9-RU-1 | 3.27 | Soil/sediment from drainage area of Former Power Plant |

**Fairchild International, Former Tannery, Giles County, Virginia**

Operations at the Tannery site in Giles County began in the late 1800's and ceased in the late 1960's. Buildings at the site burned in 1975. In 1992, Dewberry and Davis prepared an Environmental Assessment of the site for the Giles County Redevelopment Authority. The report showed high levels of several metals and one positive sample for PCB, 54 ppb, collected 1 ft. below grade. Many rusted and/or crushed 55 gallon drums, several liquid filled underground vats, and other areas containing various types of industrial and household waste were located on the site at the time of sampling on September 9, 2003.

Soil and sediment sample locations and associated PCB concentrations (ppm) are depicted in **Attachment B**, Figure 12. Sample location descriptions are also presented below in Table 12.

**Table 12. Former New River Tannery Soil/Sediment Sample Descriptions**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS030 | 9-Tannery-1 | 37.6 | Soil/sediment from underground vat |
| 3NS031 | 9-Tannery-2 | 0.89 | Soil/sediment from historical process outfall |
| 3NS032 | 9-Tannery-3 | 4.67 | Soil/Sediment from historical storm water outfall |

**Former Radford Limestone Corporation Quarry, Holston River Quarry, Pulaski County, Virginia**

The site is located on the east bank of the New River approximately 1,000 ft. downstream of Claytor Dam. PCB uses at the site have included capacitors and transformers. The site is currently inactive. The site was sampled due to oil staining in the "electrical building", the presence of an empty transformer casing, several suspected capacitors on the ground with an associated oil stain, and three pole-mounted capacitors with an associated oil stain.

The Quarry sample location and associated PCB concentration (ppm) is depicted in **Attachment B**, Figure 13. The sample location description and associated PCB concentration is presented in Table 13. EPA was immediately notified of the sample result and the site owner is working with EPA to remediate the site.

**Table 13. Former Quarry Adjacent to Claytor Lake Dam Soil Sample Description**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS038 | 9-Quarry1 | 25,472,449 | Soil from the area of the transformer pad |

**Big Walker Creek, Giles County, Virginia**

Due to known PCB activities in the Big Walker Creek watershed (see Sugar Run discussion below) two sites on Big Walker Creek were sampled. This was an area recommended for sampling by members of the Committee.

The sediment sample locations and associated PCB concentrations (ppm) are depicted in **Attachment B**, Figures 14a and 14b. The sample location descriptions and associated PCB concentrations are also presented below in Table 14. One sediment datum from Walker Creek collected at River Mile 4.34 appears to be very high for an in-stream sediment concentration. Fish tissue collections should include Walker Creek, especially between River Mile 4.34 and 17.14. Repeat sampling of stream sediment at this location is also warranted.

**Table 14. Big Walker Creek Sediment Sample Descriptions**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS006 | 9-Big Walker 1 | 1.78 | Sediment from confluence of New River near NS RR bridge |
| 3NS042 | 9-Walker 2@monitoring station | 7,640 | Sediment from monitoring station at Bane |

**Sugar Run, Giles County, Virginia**

In 1992, the former Bane School, formerly Mountain Machine Manufacturing, was the subject of an EPA investigation and subsequent removal of four 55-gallon drums containing PCB oil, 27 capacitors, and 160 tons of PCB-impacted soil. The former Bane School is located adjacent to Sugar Run, a tributary to Big Walker Creek, in Bane, Virginia. Members of the Committee identified this site for evaluation.

The sediment sample location and associated PCB concentration (in ppm) is depicted in **Attachment B**, Figure 15. The sediment sample location description and associated PCB concentration is also presented below in Table 15. Sediment data from Sugar Run below Bane School appears to be very high for an in-stream sediment concentration. Repeat sampling of stream sediment in Sugar Run below Bane School, and on-site sampling of the Bane School site, appears to be warranted.

**Table 15. Sugar Run Sediment Sample Description**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS041 | Bane 1@Sugar Run | 7,723 | Sediment from Sugar Run below the former Bane School |

**Virginia Tech, Duck Pond, Montgomery County, Virginia**

The Virginia Tech Duck Pond was selected for sampling because it receives storm water flow from the Virginia Tech Power Plant. Potential PCB uses at the Power Plant may have been in capacitors and transformers.

The sediment sample location and associated PCB concentration (ppm) is depicted in **Attachment B**, Figure 16. The sediment sample location description and associated PCB concentration is also presented below in Table 16.

**Table 16. VT Duckpond Sediment Sample Description**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS051R | 9-VA Tech Duck Pond | 9.91 | Sediment from Upper and Lower Duck Pond downstream of the VT Campus |

**Corning, Montgomery County, Virginia**

Corning is an industrial facility in operation since 1964. The facility currently makes ceramic catalytic converter substrates. Potential PCB uses at the site include capacitors and transformers.

The Corning sample location and PCB concentration (ppm) is depicted in **Attachment B**, Figure 17. The sample location description and PCB concentration is also presented below in Table 17.

**Table 17. Corning Glass Sediment Sample Description**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS052R | 9-UT- Below Corning Glass | 2.2 | Sediment from UT downstream of the facility |

**Tributary to Crab Creek, Christiansburg, Virginia**

The former Swift Farm Supply Co., currently Southern States, was the subject of a pollution investigation, PC 76-551, in 1976 for "sloppy handling" of pesticides. Adjacent to the facility is Walnut Creek, a tributary to Crab Creek. As a result of the complaint, pesticide and PCB contamination was investigated. Results reported in an agency staff memorandum dated November 19, 1976, was 4.5 ppm PCBs.

The sediment sample location and associated PCB concentration (ppm) is depicted in **Attachment B**, Figure 18. The sediment sample location description and associated PCB concentration is also presented below in Table 18.

**Table 18. Walnut Creek below Southern States Sediment Sample Description**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS050R | 9-Below Southern States Christiansburg | 10.5 | Sediment from Walnut Creek downstream of the facility |

**Cloyds Mountain Landfill, Giles County, Virginia**

Cloyds Mountain Landfill is closed landfill. Based on the a recommendation by members of the Committee, the site was sampled.

The sediment sample location and associated PCB concentration (in ppm) is depicted in **Attachment B**, Figure 19. The sediment sample location description and associated PCB concentration is also presented below in Table 19. The datum indicates some further investigation of the landfill may be warranted.

**Table 19. Drainage from Cloyds Mountain Landfill Sediment Sample Description**

| VIMS Sample ID | VADEQ Sample ID | Total PCB ppb | Sample Description |
|---|---|---|---|
| 3NS040 | 9-Cloyds1 | 17,582 | Sediment from UT downstream of the facility |

**Summary and Conclusions**

1. All samples contained some quantified level of PCBs. This is due, in part, to the low quantification levels being achieved. The presence of PCBs in a sample at a very low concentration does not indicate a site poses a risk to public health or water quality.

2. No major, ongoing sources of PCBs to the New River were identified. The Holston River Quarry site contained greater than 50 ppm total PCBs, but it does not appear that the site is a major ongoing source of PCBs to New River. EPA was immediately notified of the sample result and the site owner is working with EPA to remediate the site.

3. Certain facilities appear to have residual concentrations of PCBs present on-site. These levels are less than 50 ppm, but appear to be higher than a "background" level. Facilities may warrant further investigation based upon the PCB levels detected and include American Electric Power, Intermet, Radford Army Ammunition Plant, Bane School, and Cloyds Mountain Landfill.

4. Sediment data from Walker Creek at River Mile 4.34 (7.64 ppm) and Sugar Run below Bane School (7.72 ppm) appear to be very high for an in-stream sediment concentration. Fish tissue collections should include Walker Creek, especially between River Mile 4.34 and 17.14. Repeat sampling of stream sediment in Walker Creek at station 4.34 and Sugar Run below Bane School is also warranted.

5. DEQ is currently evaluating a statewide approach for evaluating and managing streams and facilities where PCBs have been detected. The statewide approach may address specific levels of PCBs in soil and sediment that should be further investigated to minimize the potential for further releases of PCBs to state waters.

6. Substances containing PCBs, such as Aroclors, are mixtures of different PCB congeners. Determination of PCBs in environmental samples should use individual PCB congeners as standards, as opposed to Aroclors, to account for weathering that may have altered the chemical signature of PCBs released to the environment for an extended period of time. In the course of this investigation, samples analyzed for Aroclors were often reported as "non-detectable," when the congener analysis resulted in the detection of PCBs in the same sample in the parts per million range.

## Attachment A:

- New River Fish Tissue and Sediment Data
- New River PCB Source Search Citizen's Committee Members
- Facility Information Sources
- Facility Site Selection Criteria
- New River PCB Source Investigation Survey

**Information Sources**

DEQ Records: Comprehensive Environmental Data System (CEDS)
Permit, inspection, and registration documents and pollution incident reports;
Voluntary Remediation Program database;
Brownfields site screening reports;
Virginia Geographic Environmental Mapping System (http://lexington.yesvirginia.org/);
Toxics Release Inventory.

EPA Records: PCB Transformer Registration Database (http://www.epa.gov/opptintr/pcb/data.html);
PCB Activity Database System (http://www.epa.gov/opptintr/pcb/data.html);
The Monsanto List;
Enviromapper (http://maps.epa.gov/enviro/html/mod/enviromapper/index.html);
Envirofacts Warehouse (http://www.epa.gov/enviro/index.html) including:
Permit Compliance System Database,
RCRAInfo,
CERCLA,
TRI.

Other: Citizens' Advisory Committee Meeting minutes;
Historical Documents;
Information provided by area residents and government employees.

# New River PCB
# Source Search Citizen's Committee

## Committee Chair

**Dr. Rick Roth**; Associate Professor, Geography, Radford University

## Committee Members

**Mr. David Bernard**; Owner, Aquarius Plumbing

**Ms. S. Darliet Colley, RN, C**; St. Albans Psyciatric Hospital

**Mr. Sean Hash**; Tangent Outfitters & New River Guides

**Mr. Phil Lockard**; Senior Environmental Engineer, Celanease Acetate

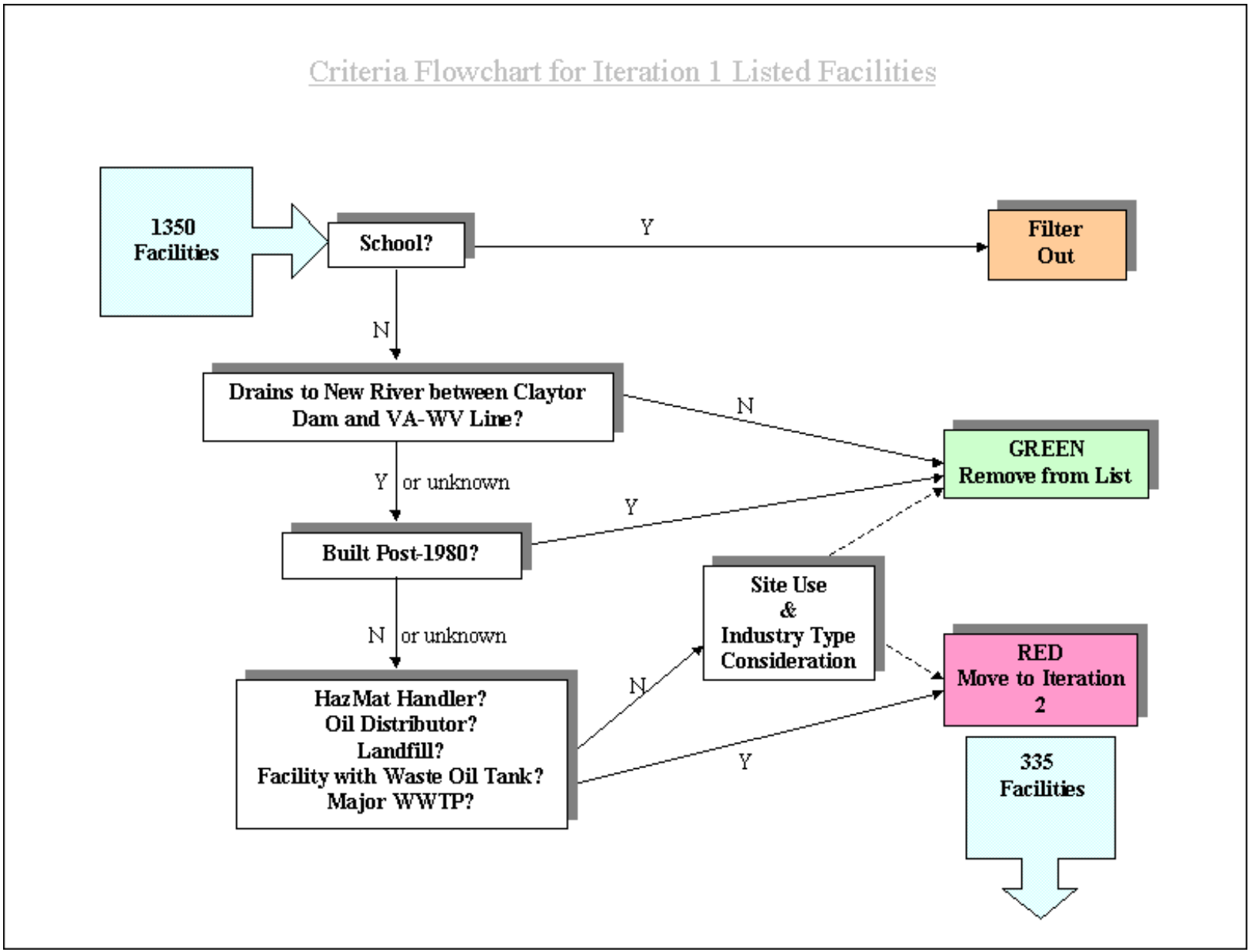
**Mr. Charles Maus**; Former Executive Director, Peppers Ferry Regional Wastewater Treatment Authority

**W. Tom Miller**; Realtor; Raines Real Estate

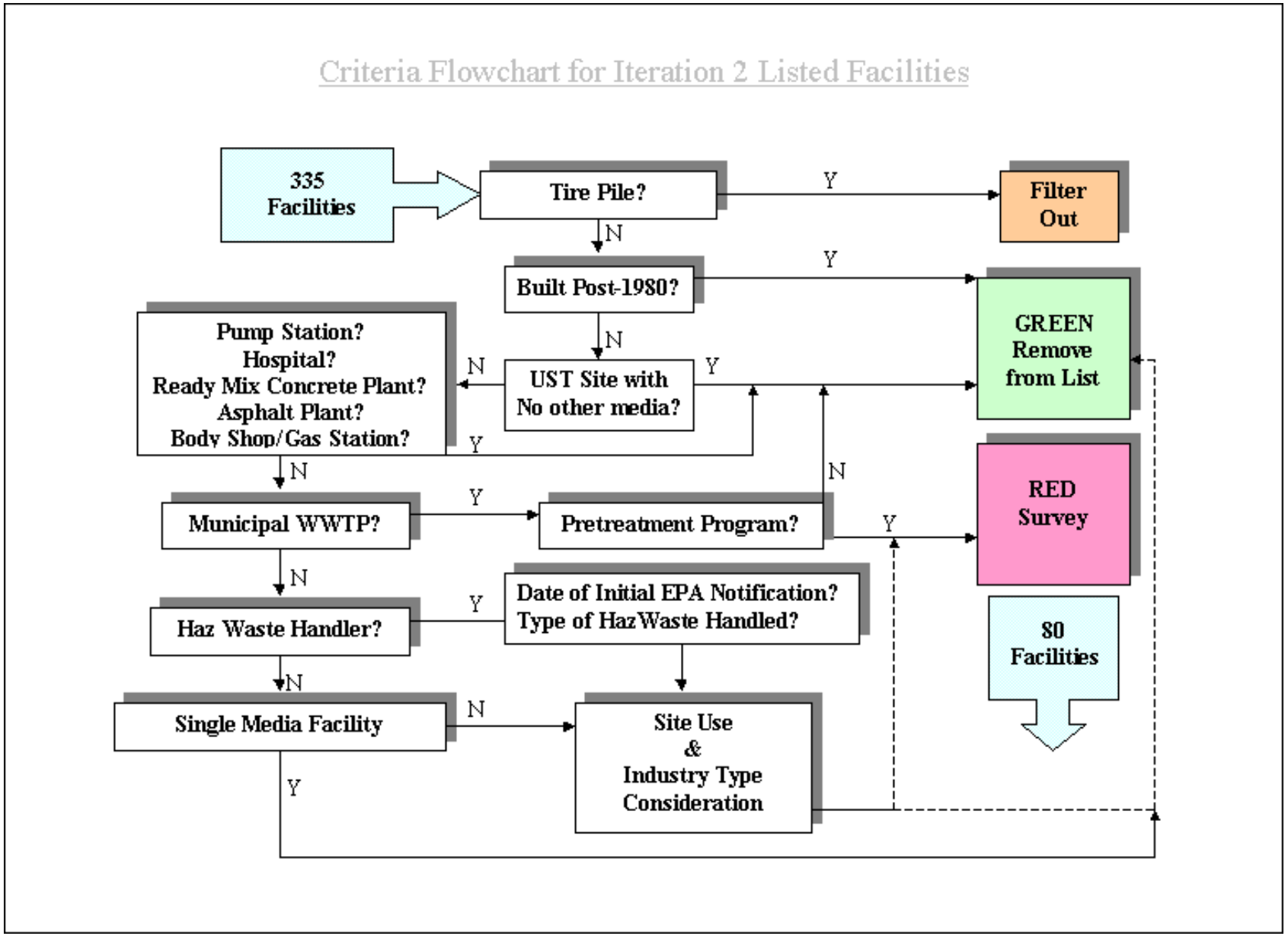
**Mr. Ron Powers**; Chairman, Friends of Claytor Lake

**Ms. Llyn Sharp**; Assistant Director, VPI&SU Natural History Museum

Flowchart 1.


Criteria Flowchart for Iteration 1 Listed Facilities
1350 Facilities
School?
Y
Filter Out
N
Drains to New River between Claytor Dam and VA-WV Line?
N
GREEN Remove from List
Y or unknown
Y
Built Post-1980?
N or unknown
Site Use & Industry Type Consideration
RED Move to Iteration 2
HazMat Handler?
Oil Distributor?
Landfill?
Facility with Waste Oil Tank?
Major WWTP?
N
Y
335 Facilities

Flowchart 2.


Criteria Flowchart for Iteration 2 Listed Facilities
335 Facilities
Tire Pile?
Y
Filter Out
N
Built Post-1980?
Y
GREEN Remove from List
N
Pump Station?
Hospital?
Ready Mix Concrete Plant?
Asphalt Plant?
Body Shop/Gas Station?
N
UST Site with No other media?
Y
Y
N
Municipal WWTP?
Y
Pretreatment Program?
N
Y
RED Survey
N
Haz Waste Handler?
Y
Date of Initial EPA Notification?
Type of HazWaste Handled?
80 Facilities
N
Single Media Facility
N
Site Use & Industry Type Consideration
Y

**MEMORANDUM**
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
West Central Regional Office

3019 Peters Creek Road Roanoke, VA 24019

SUBJECT: New River PCB Source Investigation Survey
FROM: DEQ-WCRO
DATE: April 5, 2016

---

Your Name, Title, and Phone # : _____
Facility Name: _____
Facility Location: _____
Permit Nos (if applicable): _____

**To the best of your knowledge, please provide answers to the following questions:**

1. When did operations begin at this facility? _____

2. Please list any known former uses/occupants of this site. _____
   _____
   _____
   _____

3. Were PCBs, or materials containing PCBs, ever used on-site in any of the following equipment or activities?

| **YES** | **NO** | | **COMMENTS** |
|---|---|---|---|
| ___ | ___ | transformers | |
| ___ | ___ | capacitors | |
| ___ | ___ | generators | |
| ___ | ___ | heat extractors/exchangers | |
| ___ | ___ | pesticides | |
| ___ | ___ | road treatment for dust control | |
| ___ | ___ | oil fired boilers | |
| ___ | ___ | oil heated presses | |
| ___ | ___ | other (plasticizers, emulsion oils, etc.) | |

   a. If power generators were used on-site to generate power for the facility, what was the duration of use and the power source? _____
      _____

   b. If oil fired boilers were used on-site, was waste oil ever burned? _____

4. If PCBs were used on-site:

   a. During what time periods were they used?_____
   b. How and where were they stored? _____
   c. Were any releases or leaks detected? _____
   d. Do analytical data exist for any release event(s)? _____
   e. How and where were PCBs or PCB contaminated materials disposed of? _____

5. Is the facility wastewater discharge permitted by DEQ___, or by municipal pretreatment program___?

   a. Have PCBs ever been detected in wastewater? _____
   c. Have PCBs ever been detected in sludge? _____

   If yes, what was the period, duration, PCB concentration, and follow-up action taken? _____
   _____
   _____

6. Were PCBs ever detected in storm water discharges? _____
   If yes, what was the period, duration, PCB concentration, and follow-up action taken?_____
   _____
   _____
   _____
   _____

7. Has this facility ever operated a landfill? _____

   If yes: a. What was the period of operation? _____
   b. Was it a permitted facility? _____
   c. What is the location of the landfill? _____
   d. What materials were disposed of? _____
   f. Are PCB data available for the landfill, including groundwater, storm water, or soil?
   _____
   _____
   _____

## Selected Names for PCB-Containing Substances

Table 1. Trade and common names for PCB-containing materials (not all-inclusive)

| | | | |
|---|---|---|---|
| ALC | ASK | Aceclor | Adkarel, |
| Apirorlio | Aroclor | Asbestol | Ascarele |
| Askarel * | Bakola 131 | Capacitor 21 | Caswell no 672A |
| Chlophen | Chlorextol | Clophen | Cloresil |
| Chlorinol | Clorinal | Clorphen | DK |
| Delor | Diaclor | Diconal | Ducanol |
| Dykanol | EEC-18 | Educrel | Elemex |
| Elinol | Eucarel | Fenclor | Fenchlor |
| Gechloreerdedifenyl | Hydol | Hyrol | Hyvol |
| Inclor | Inerteen | Kanegafuchi | Kaneclor |
| Kanechlor | Kennechlor | MCS 1489 | Magvar |
| Montar | Monter | Nepolin | No-Flamol |
| Non-Flammable Liquid | Phenochlor | Phenoclor | Plastivar |
| Pydraul | Pyralene | Pyranol (GE) | Pyroclor |

| | | | |
|---|---|---|---|
| Saf-T-Kuhl | Santotherm | Santotherm FR | Santovac 1 and 2 |
| Solvol | Sovtol | Sovol | Therminol ** |

* Generic for a PCB and solvent mixture.

** Therminol products now formulated in the U.S. do not contain PCBs.

## Attachment B:

- Figures

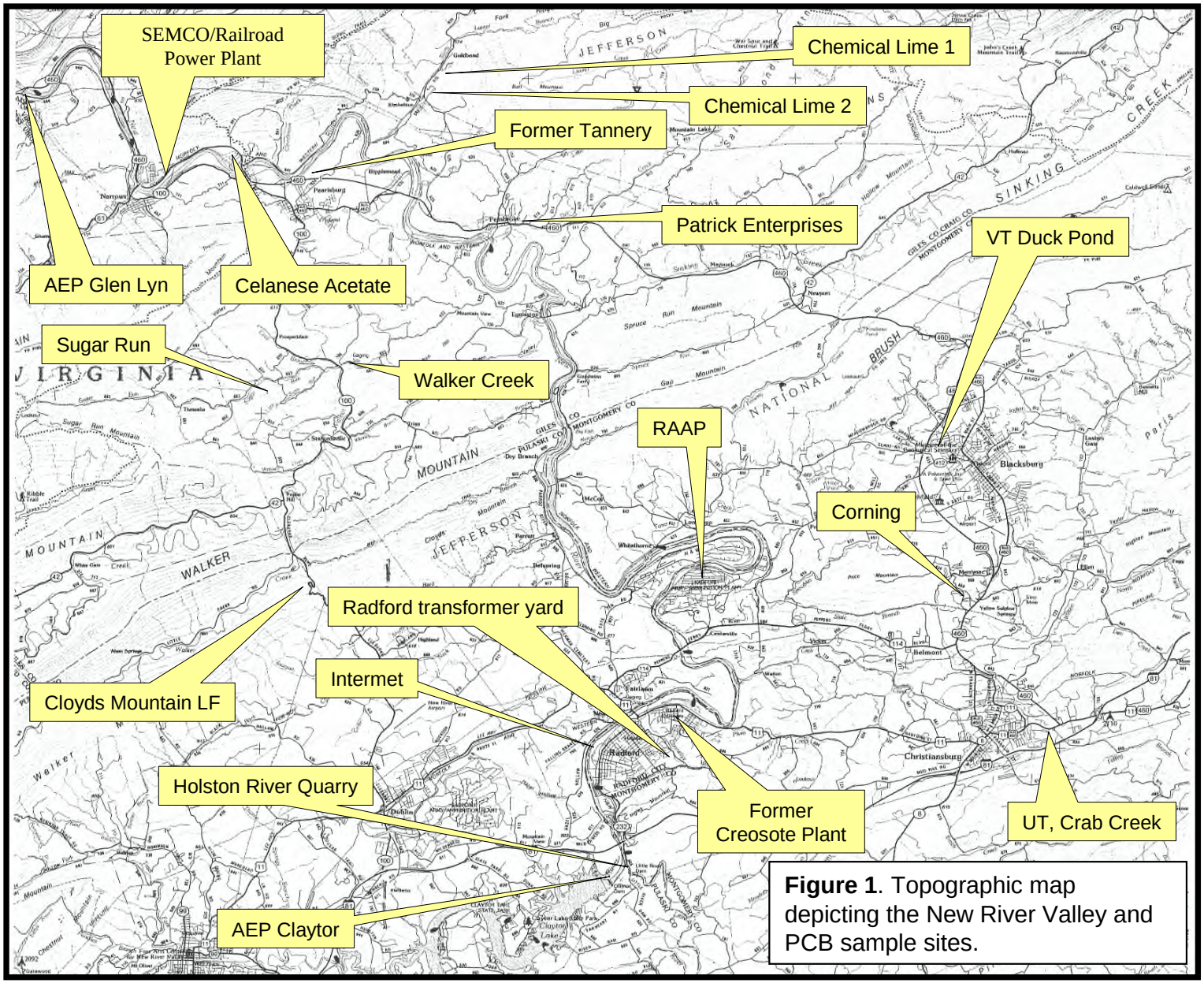



**Figure 1**. Topographic map depicting the New River Valley and PCB sample sites.

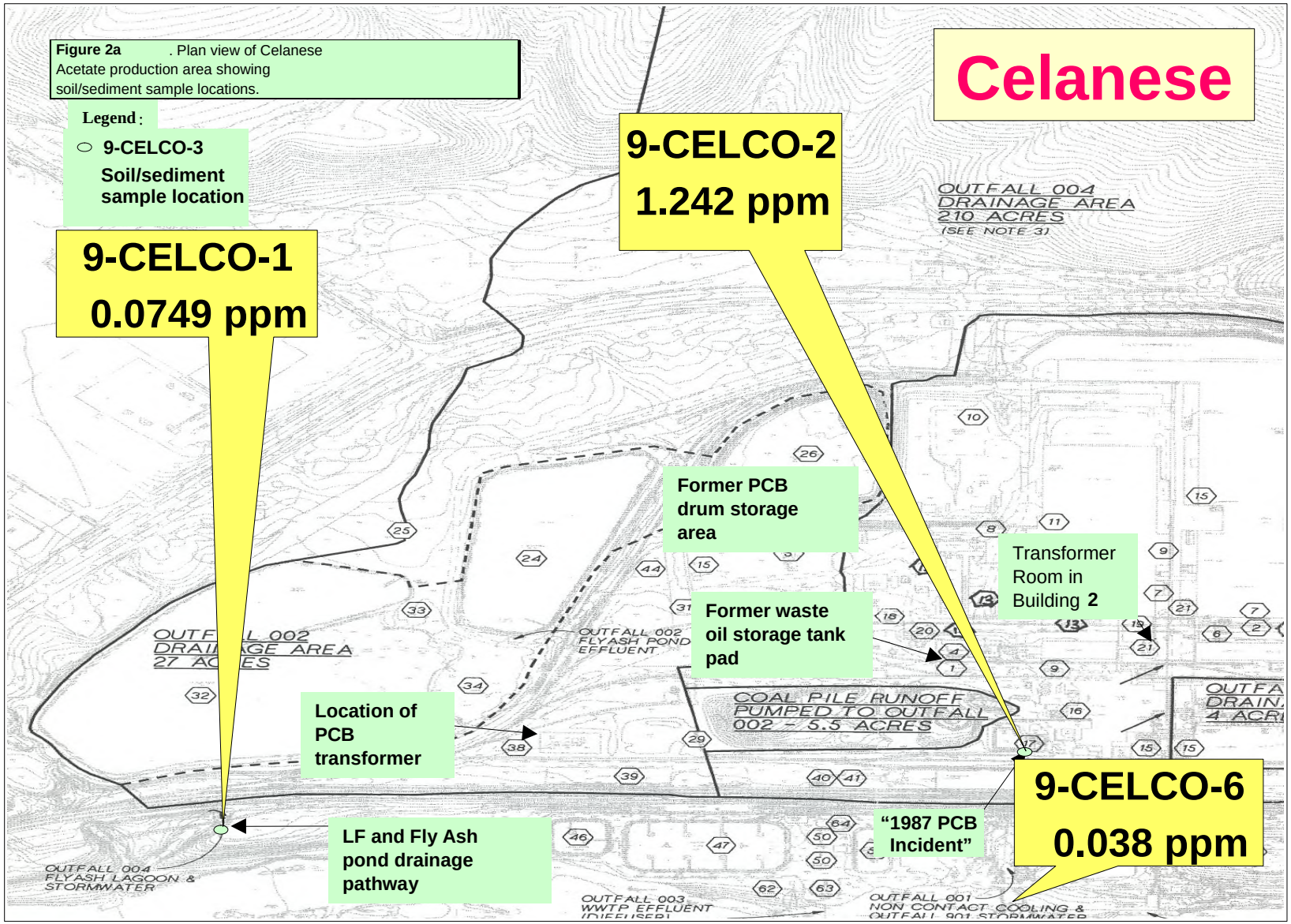


Figure 2a . Plan view of Celanese Acetate production area showing soil/sediment sample locations.
Legend:
9-CELCO-3
Soil/sediment sample location
Celanese
9-CELCO-2
1.242 ppm
9-CELCO-1
0.0749 ppm
9-CELCO-6
0.038 ppm
OUTFALL 004 DRAINAGE AREA 210 ACRES (SEE NOTE 3)
Former PCB drum storage area
Transformer Room in Building 2
Former waste oil storage tank pad
Location of PCB transformer
LF and Fly Ash pond drainage pathway
"1987 PCB Incident"
OUTFALL 002 DRAINAGE AREA 27 ACRES
OUTFALL 002 FLYASH POND EFFLUENT
COAL PILE RUNOFF PUMPED TO OUTFALL 002 - 5.5 ACRES
OUTFALL 004 FLYASH LAGOON & STORMWATER
OUTFALL 003 WWTP EFFLUENT (DIFFUSER)
OUTFALL 001 NON CONTACT COOLING & OUTFALL 901 STORMWATER

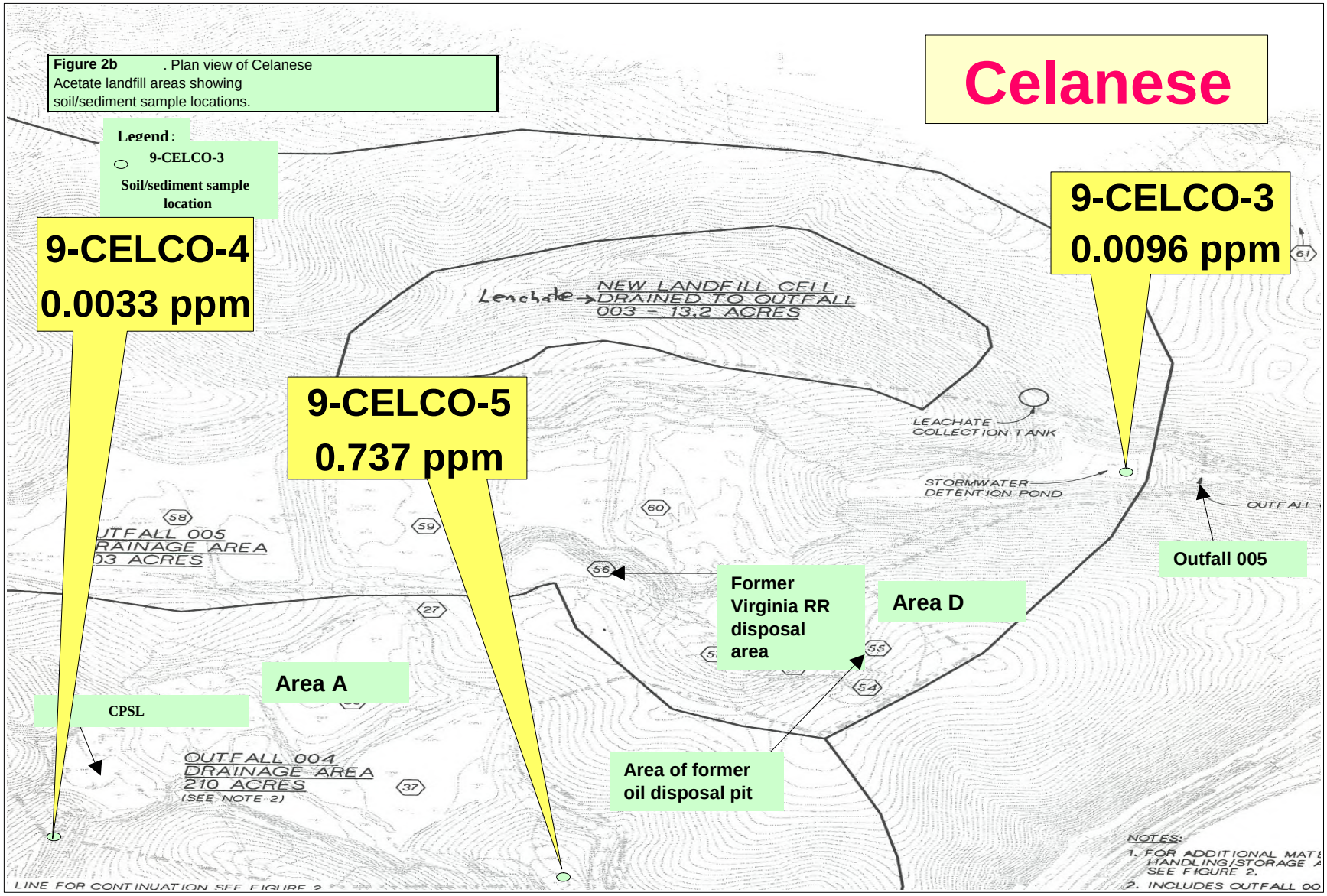


Figure 2b . Plan view of Celanese Acetate landfill areas showing soil/sediment sample locations.
Celanese
Legend:
9-CELCO-3
Soil/sediment sample location
9-CELCO-4
0.0033 ppm
9-CELCO-5
0.737 ppm
9-CELCO-3
0.0096 ppm
Leachate
NEW LANDFILL CELL
DRAINED TO OUTFALL
003 - 13.2 ACRES
LEACHATE COLLECTION TANK
STORMWATER DETENTION POND
OUTFALL
Outfall 005
Former Virginia RR disposal area
Area D
Area A
CPSL
Area of former oil disposal pit
OUTFALL 004
DRAINAGE AREA
210 ACRES
(SEE NOTE 2)
NOTES:
1. FOR ADDITIONAL MATE
HANDLING/STORAGE A
SEE FIGURE 2.
2. INCLUDES OUTFALL 00
LINE FOR CONTINUATION SEE FIGURE 2

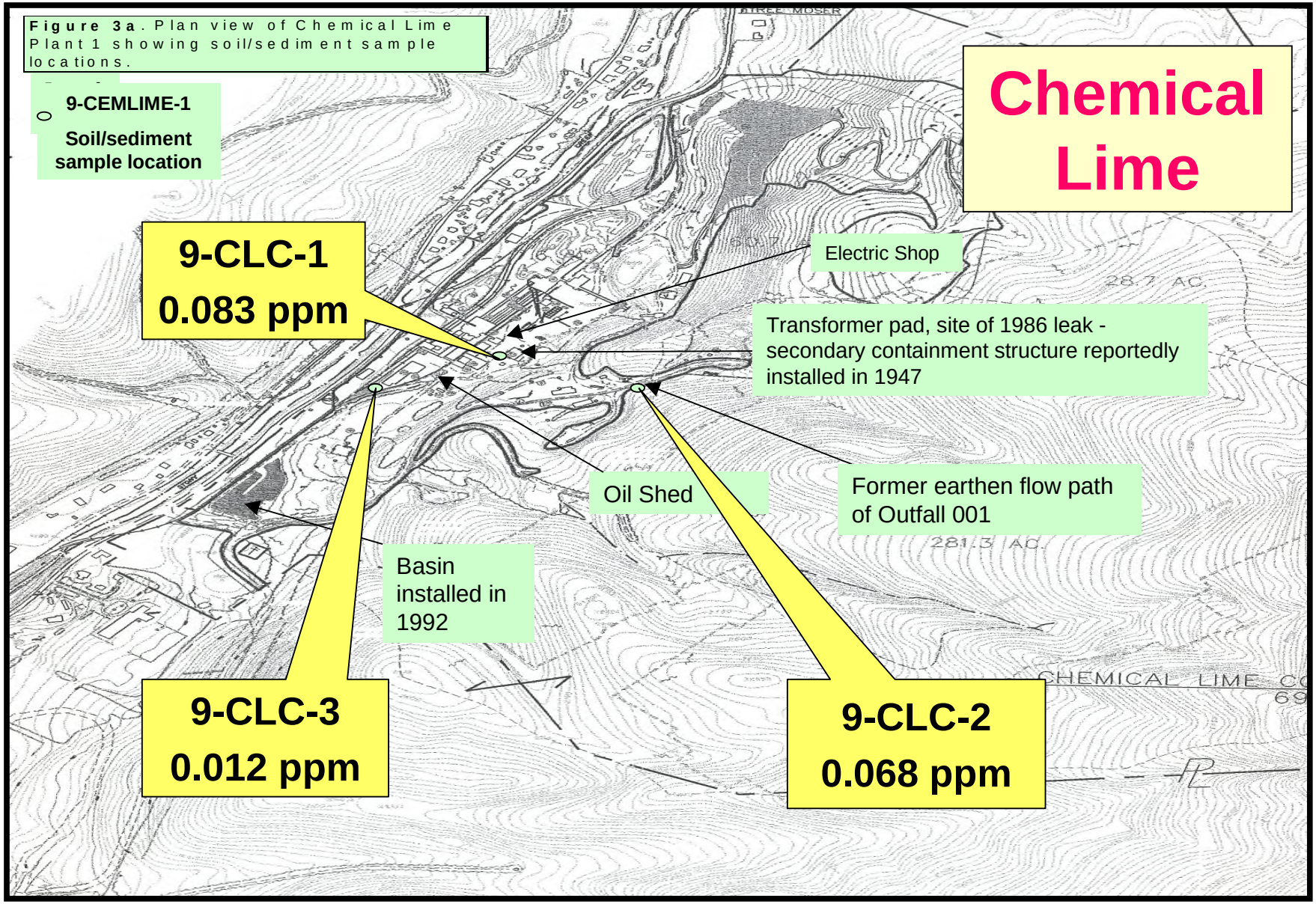


Figure 3a. Plan view of Chemical Lime Plant 1 showing soil/sediment sample locations.
9-CEMLIME-1
Soil/sediment sample location
Chemical Lime
9-CLC-1
0.083 ppm
Electric Shop
Transformer pad, site of 1986 leak - secondary containment structure reportedly installed in 1947
Oil Shed
Former earthen flow path of Outfall 001
Basin installed in 1992
9-CLC-3
0.012 ppm
9-CLC-2
0.068 ppm
28.7 AC.
281.3 AC.
CHEMICAL LIME

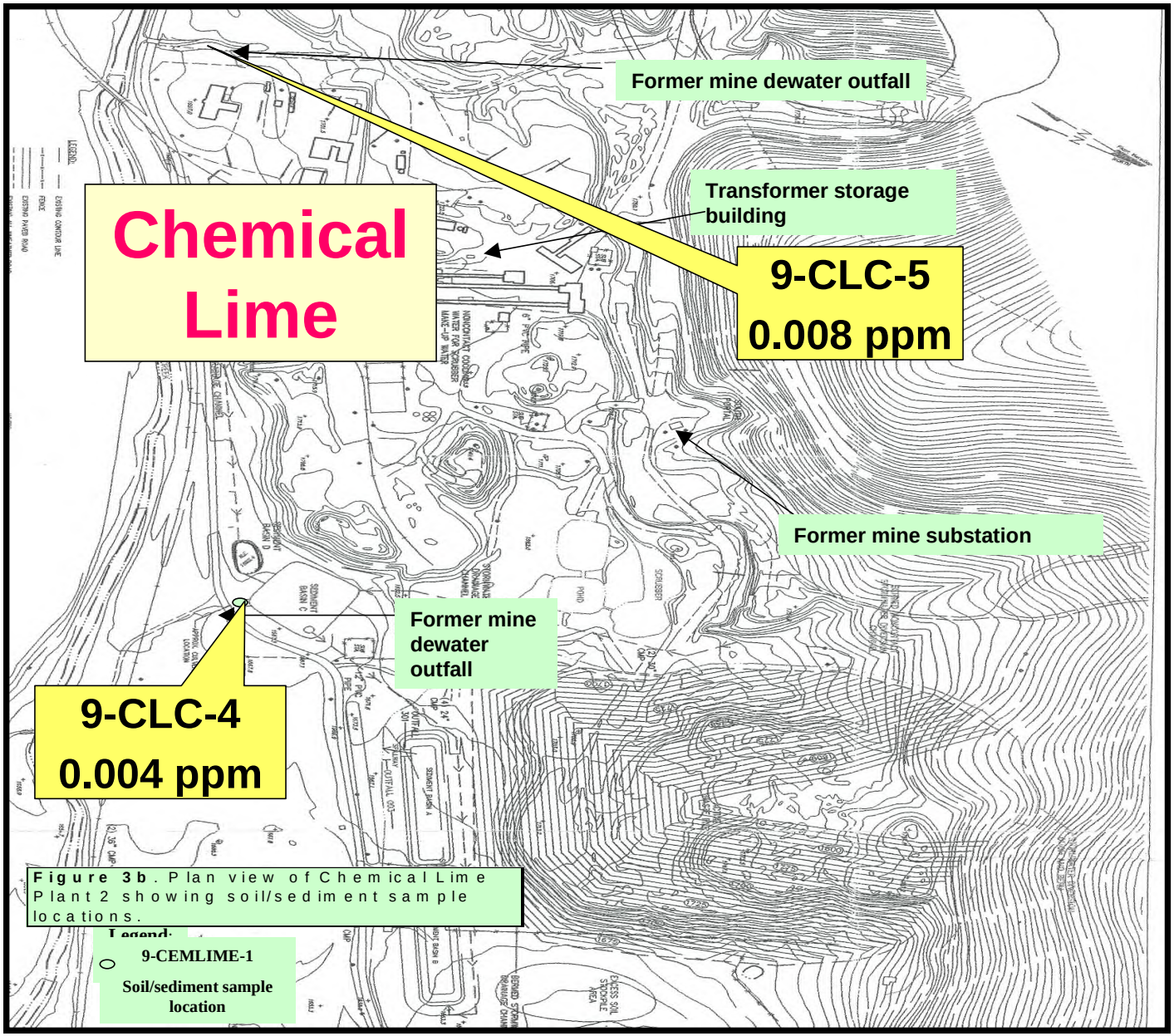



**Figure 3b**. Plan view of Chemical Lime Plant 2 showing soil/sediment sample locations.

Figure 4a. Plan view of AEP Glen Lyn showing soil/sediment sample locations.

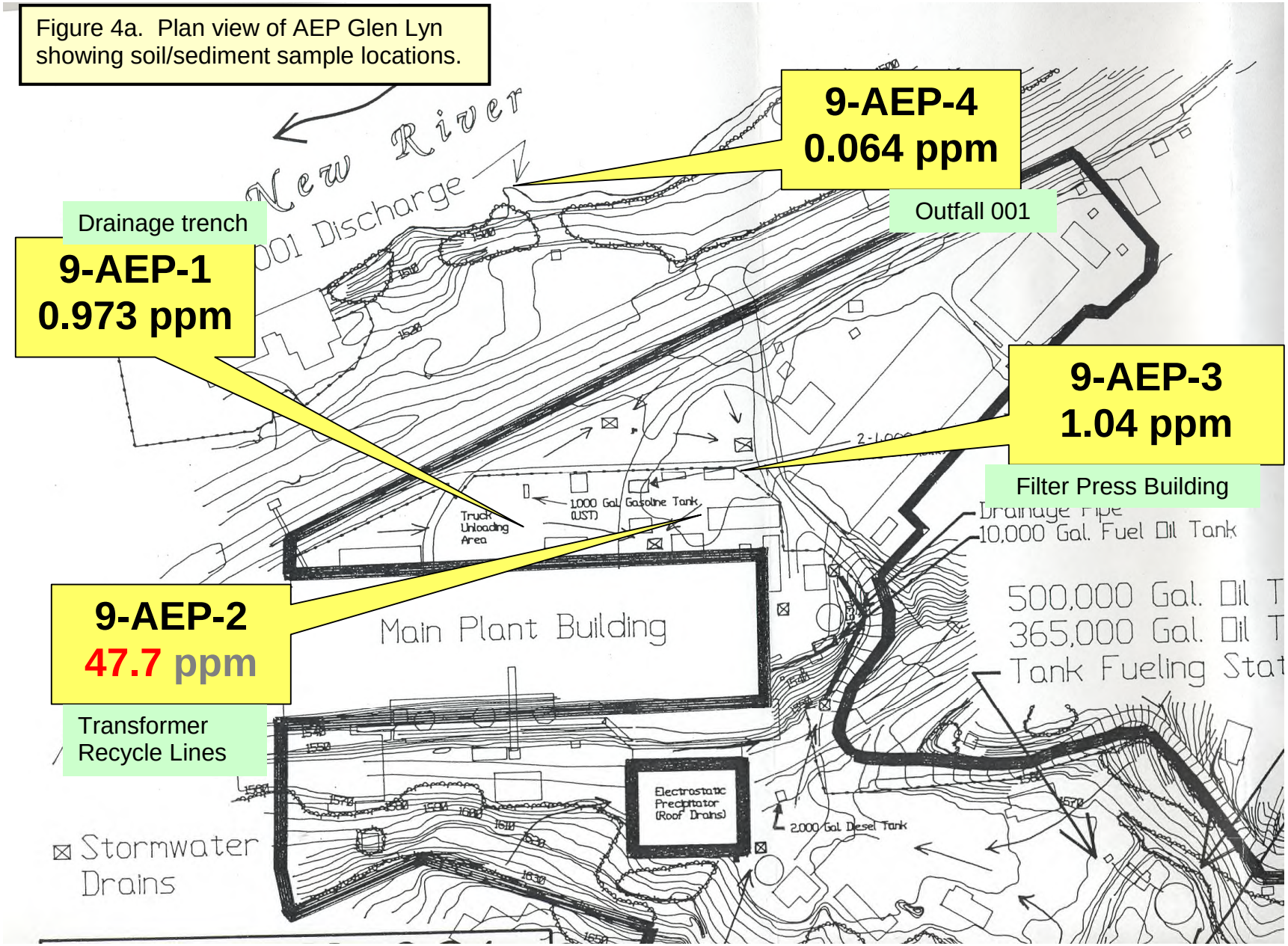


Figure 4b. Plan view of AEP Glen Lyn showing sediment sample location.

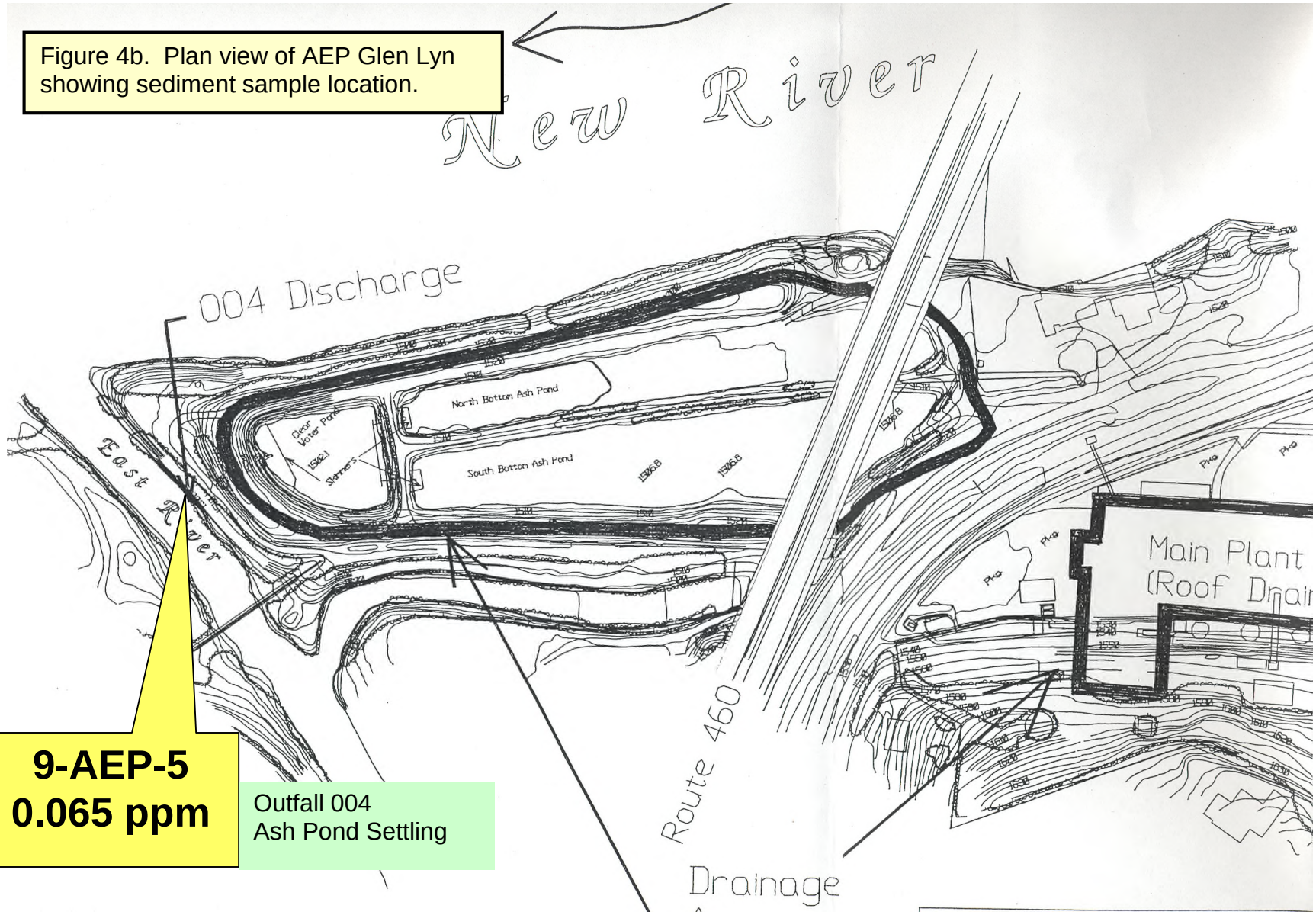
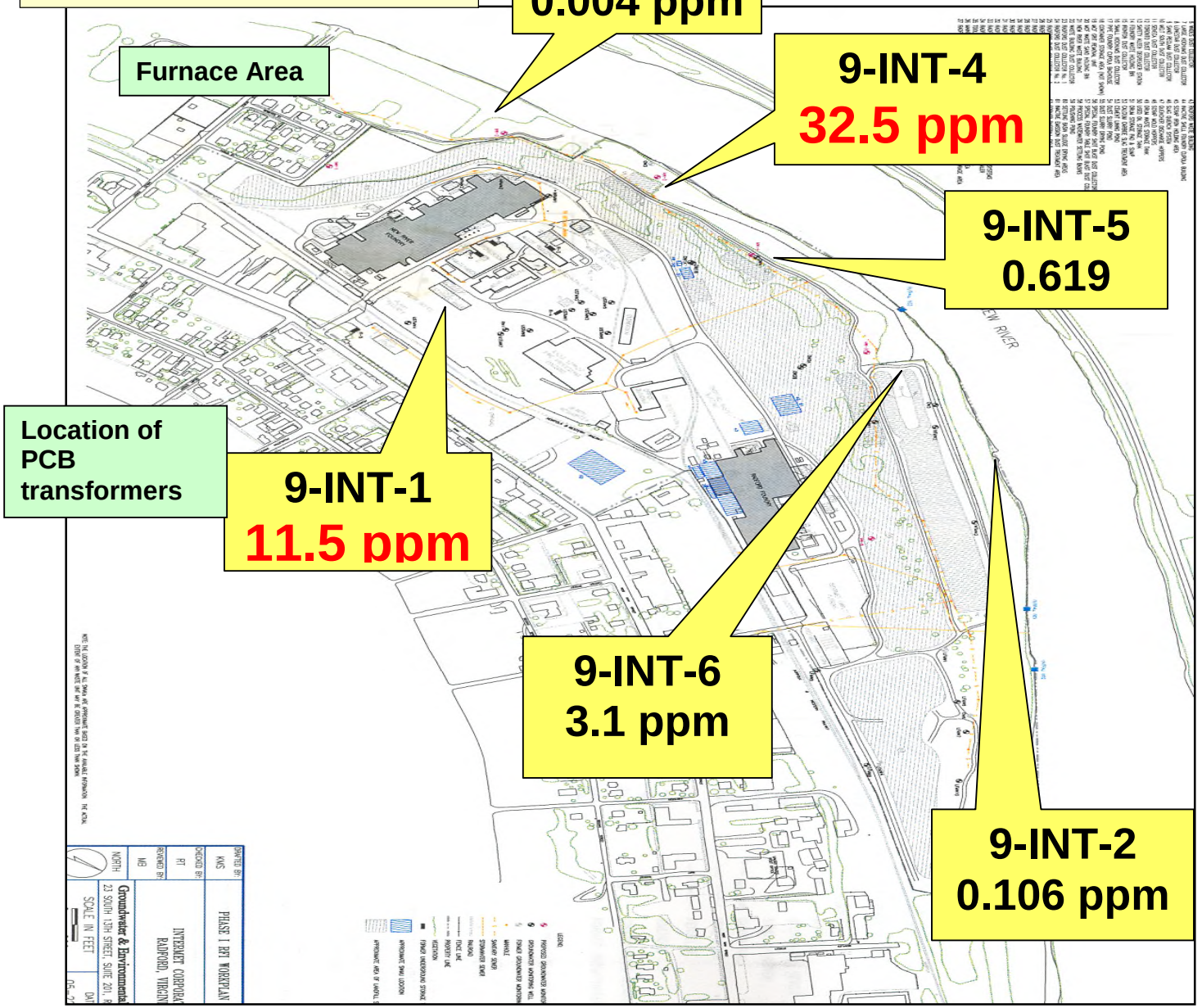


**Figure 5. Plan view of Intermet showing soil/sediment sample locations.**



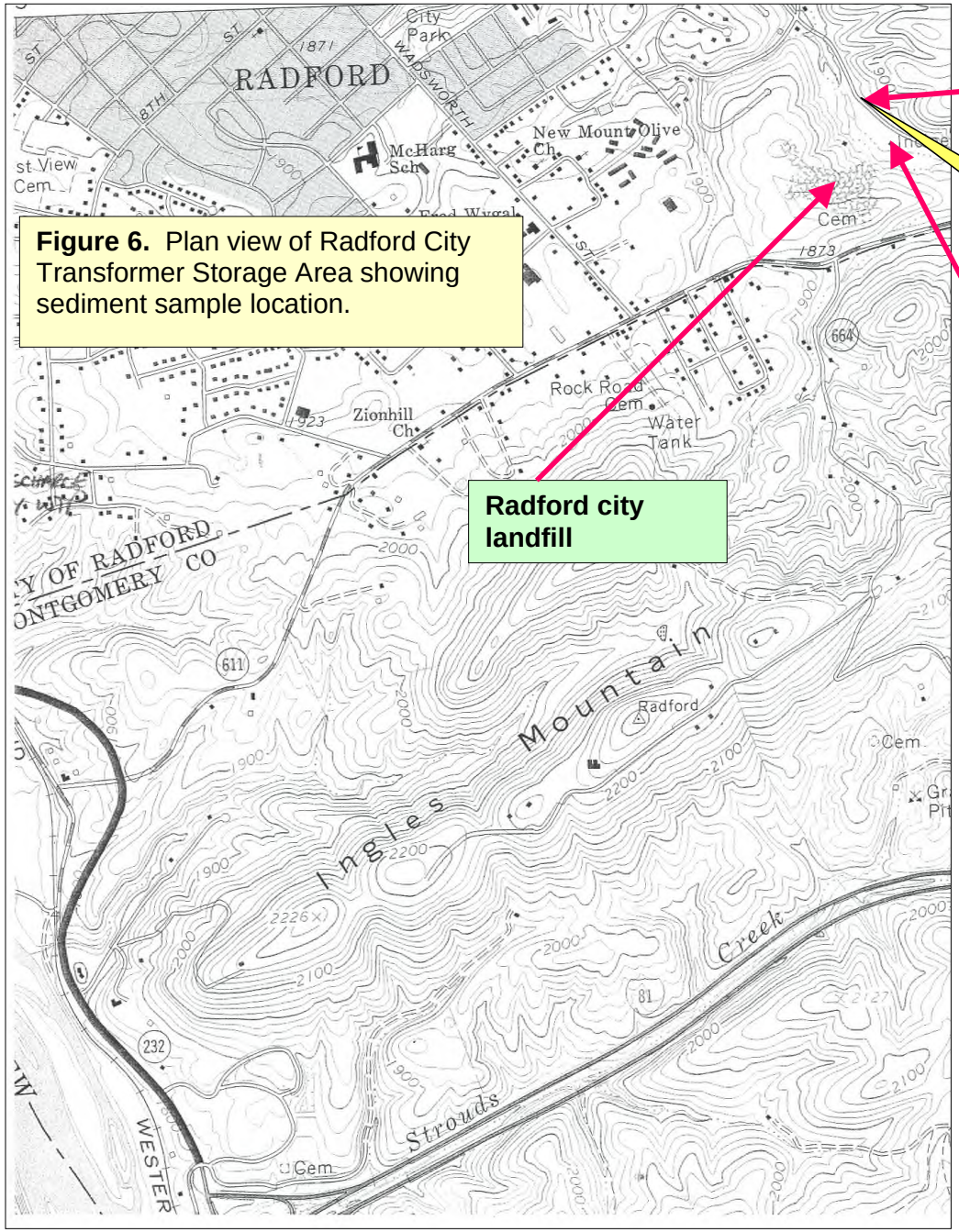



**Figure 6.** Plan view of Radford City Transformer Storage Area showing sediment sample location.

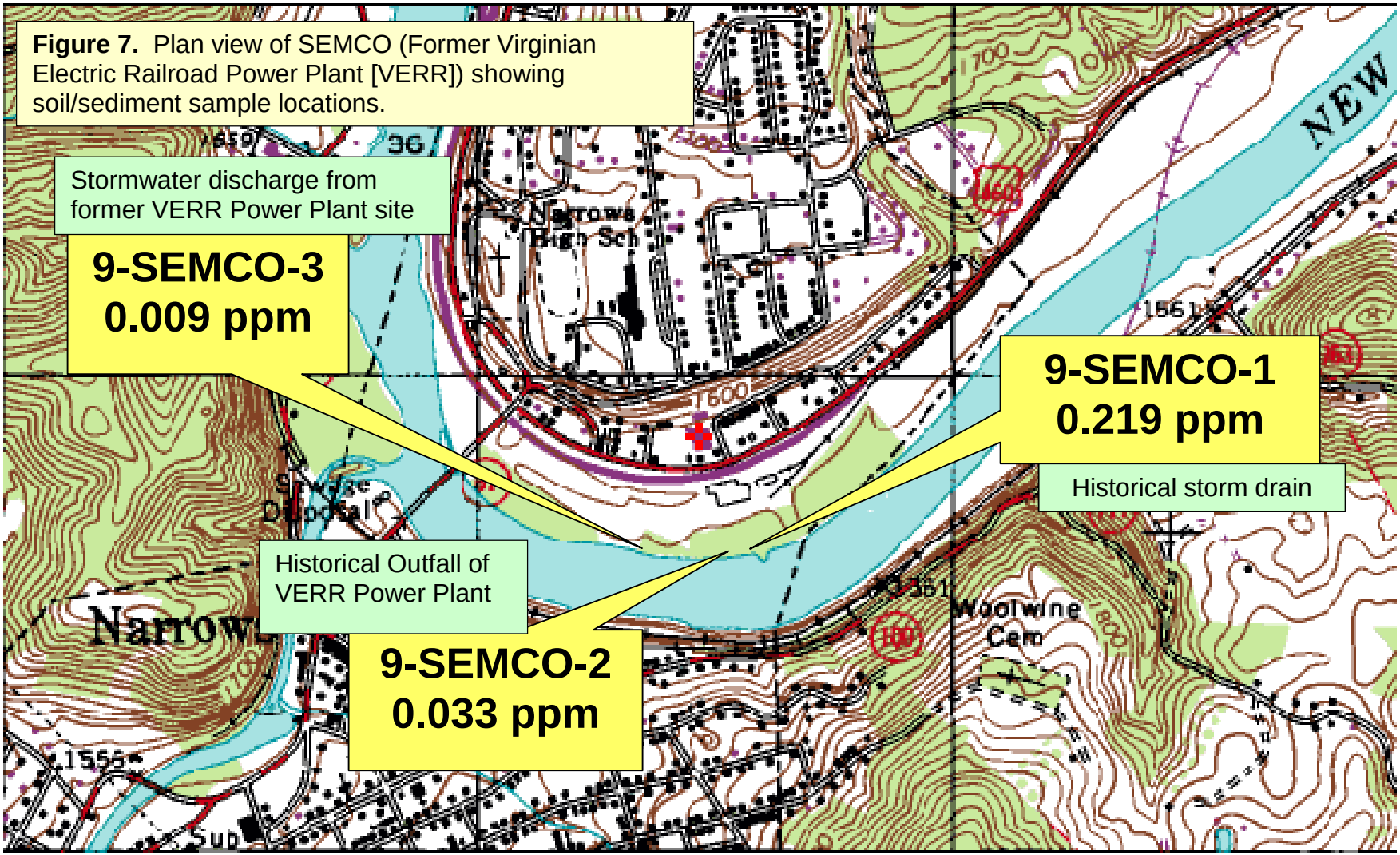



**Figure 7.** Plan view of SEMCO (Former Virginian Electric Railroad Power Plant [VERR]) showing soil/sediment sample locations.

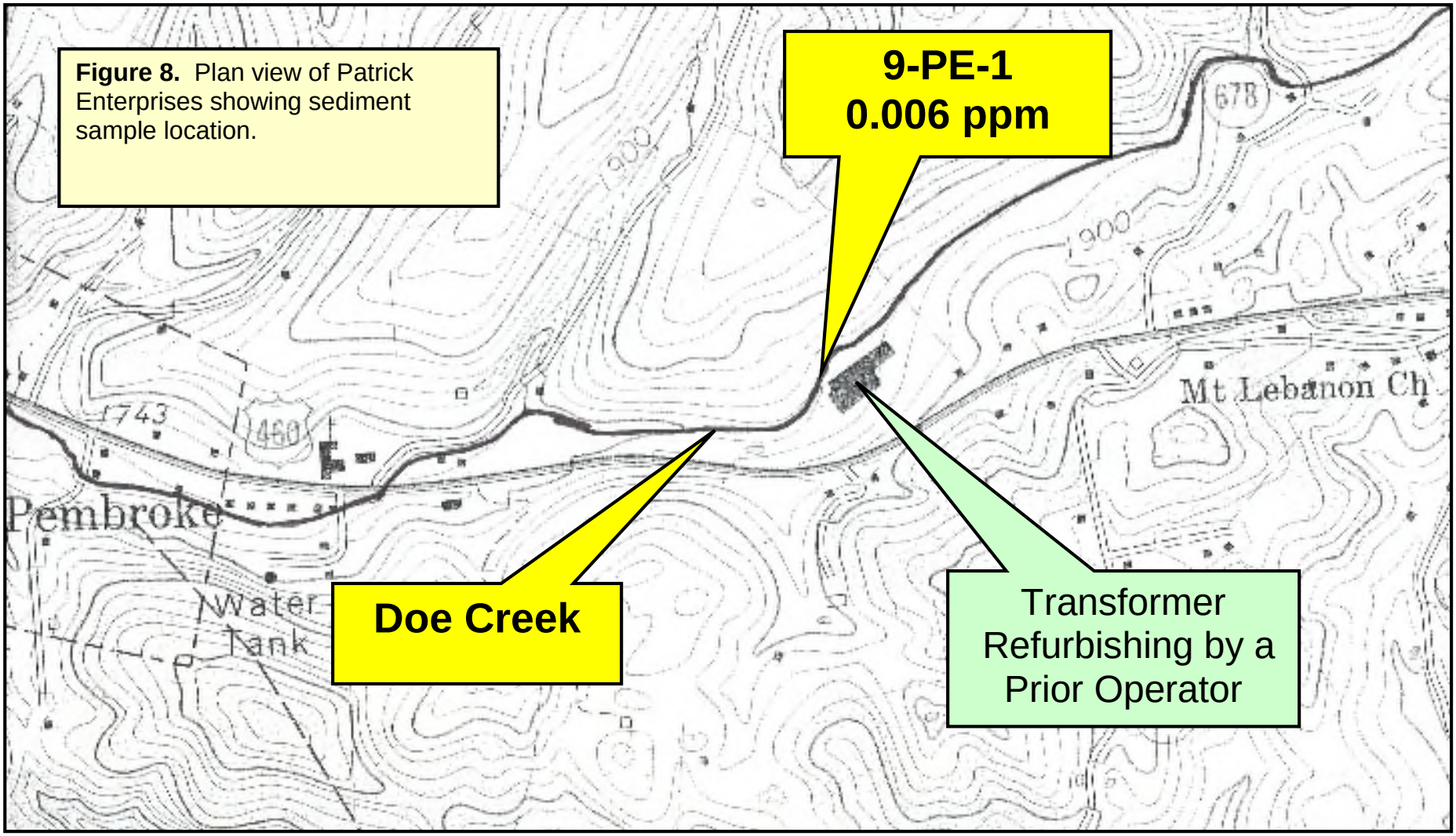
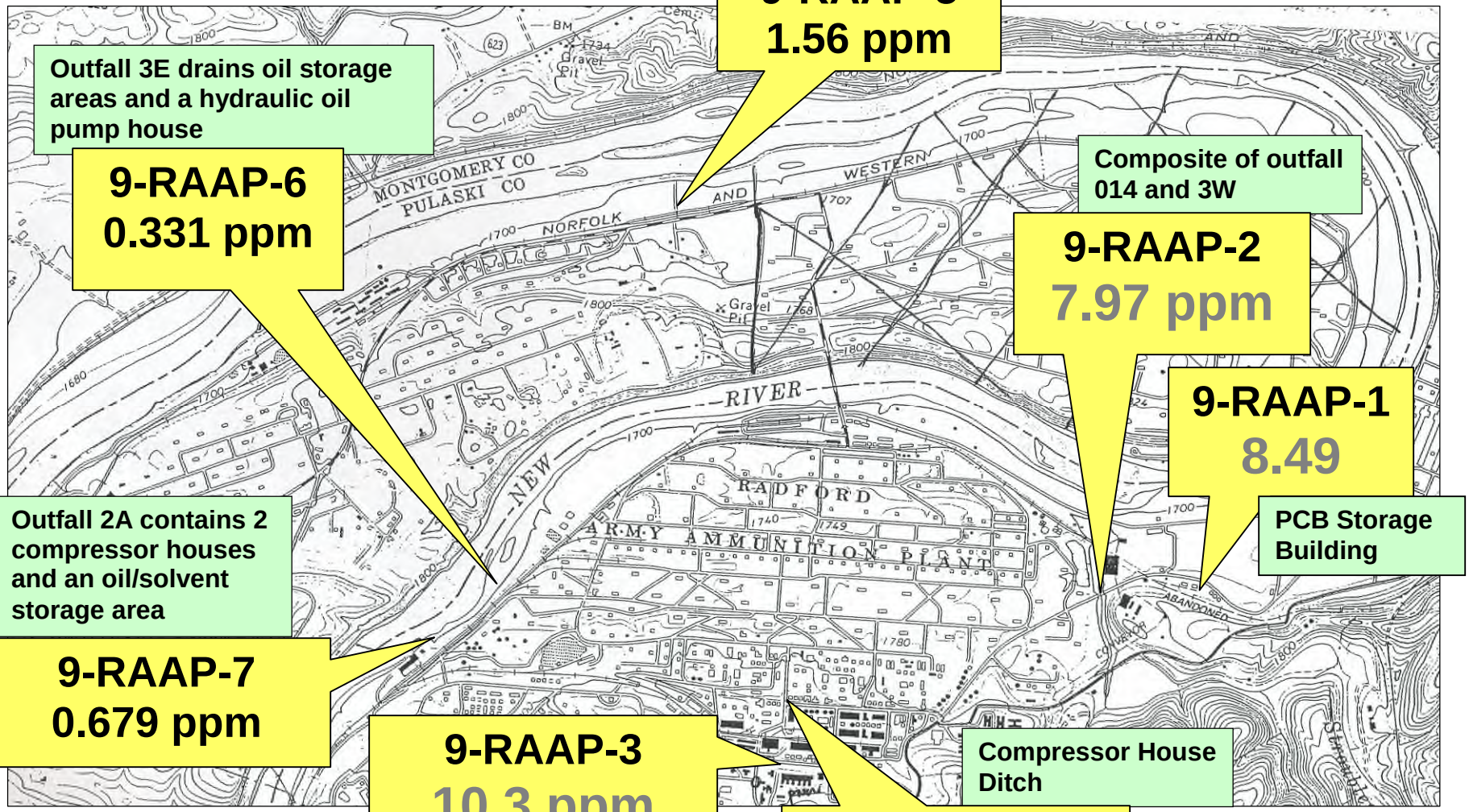



**Figure 8.** Plan view of Patrick Enterprises showing sediment sample location.

**Figure 9.** Plan view of RAAP showing soil/sediment sample locations.



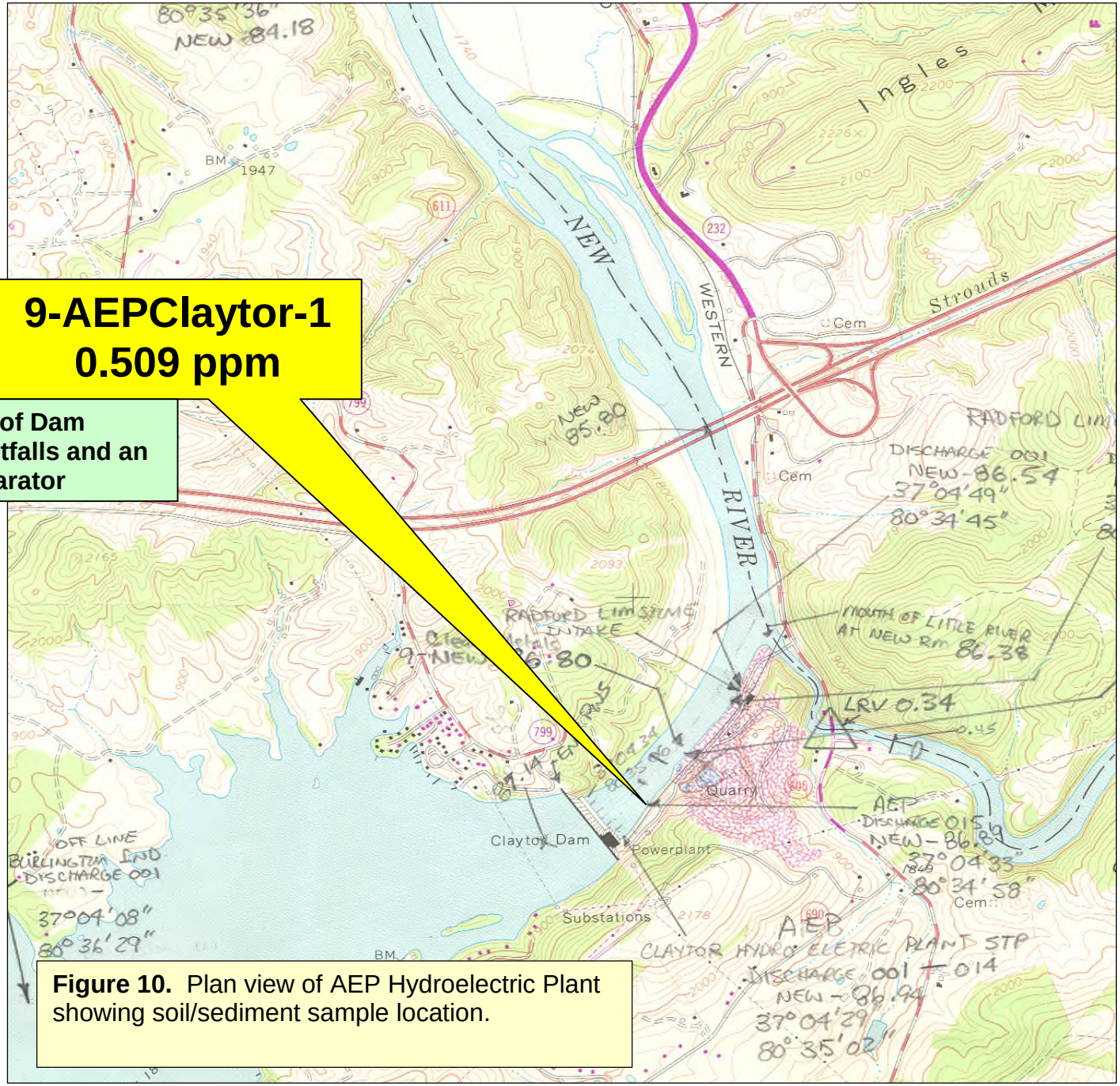



**Figure 10.** Plan view of AEP Hydroelectric Plant showing soil/sediment sample location.

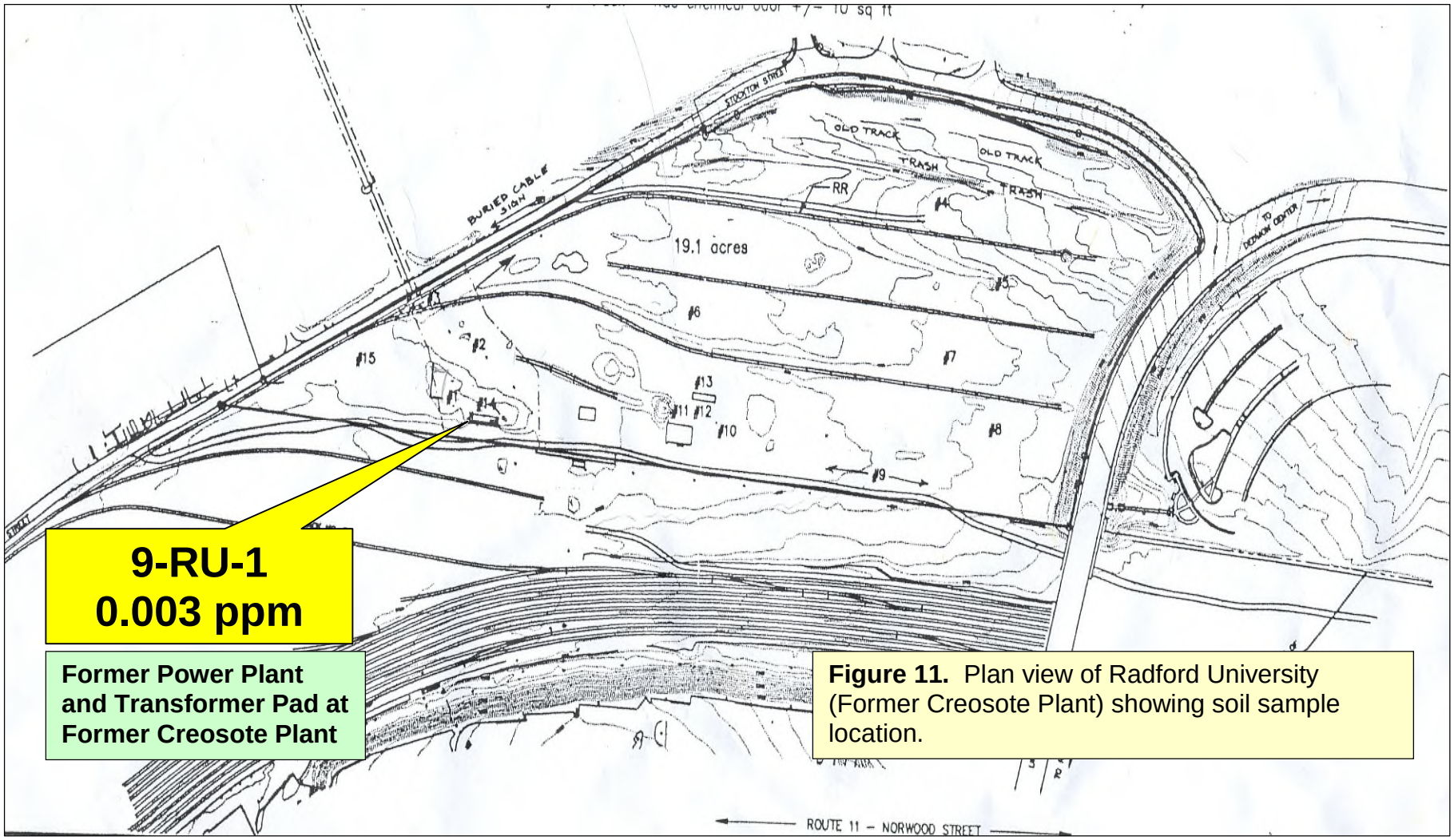
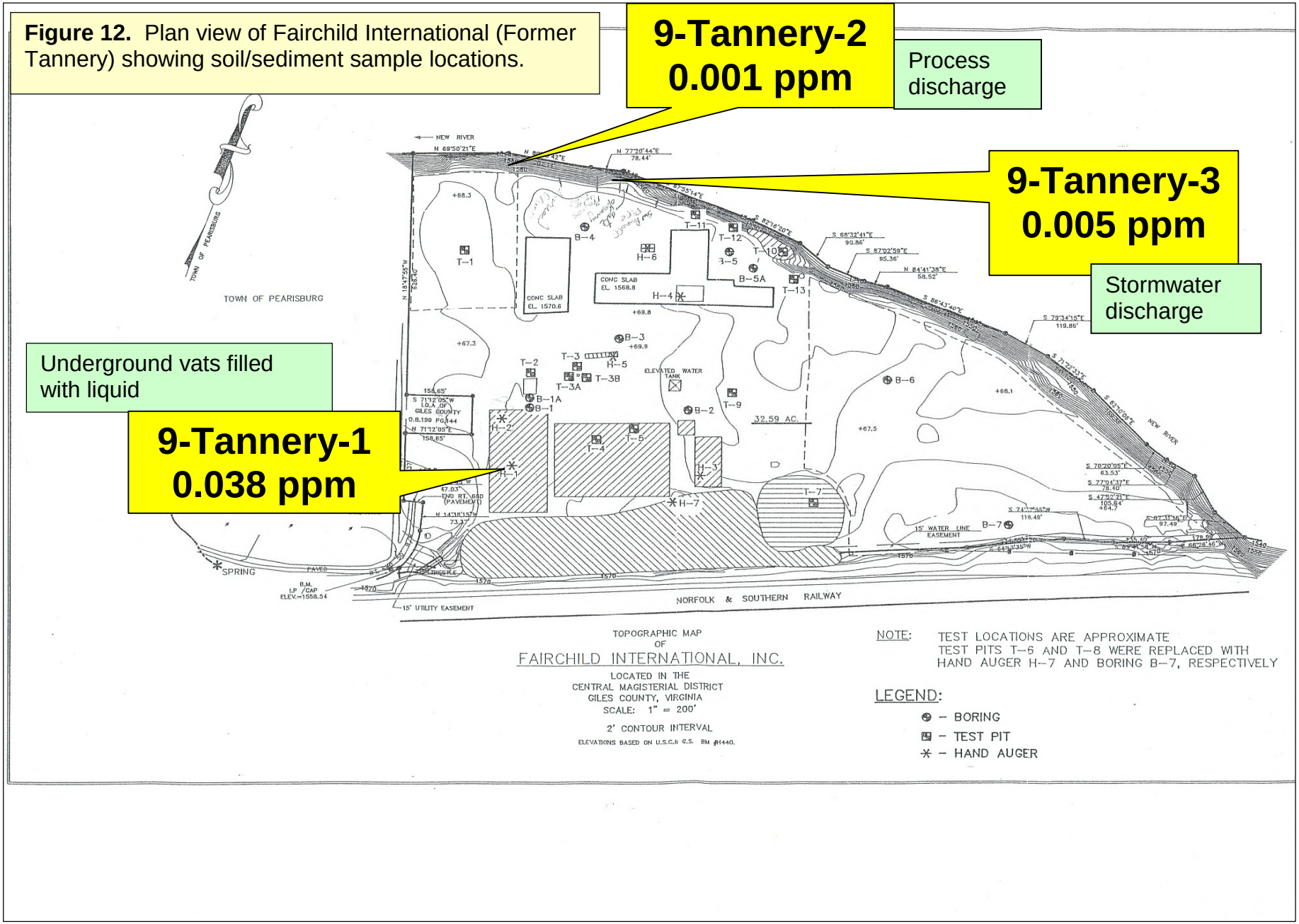



**Figure 11.** Plan view of Radford University (Former Creosote Plant) showing soil sample location.

**Figure 12.** Plan view of Fairchild International (Former Tannery) showing soil/sediment sample locations.



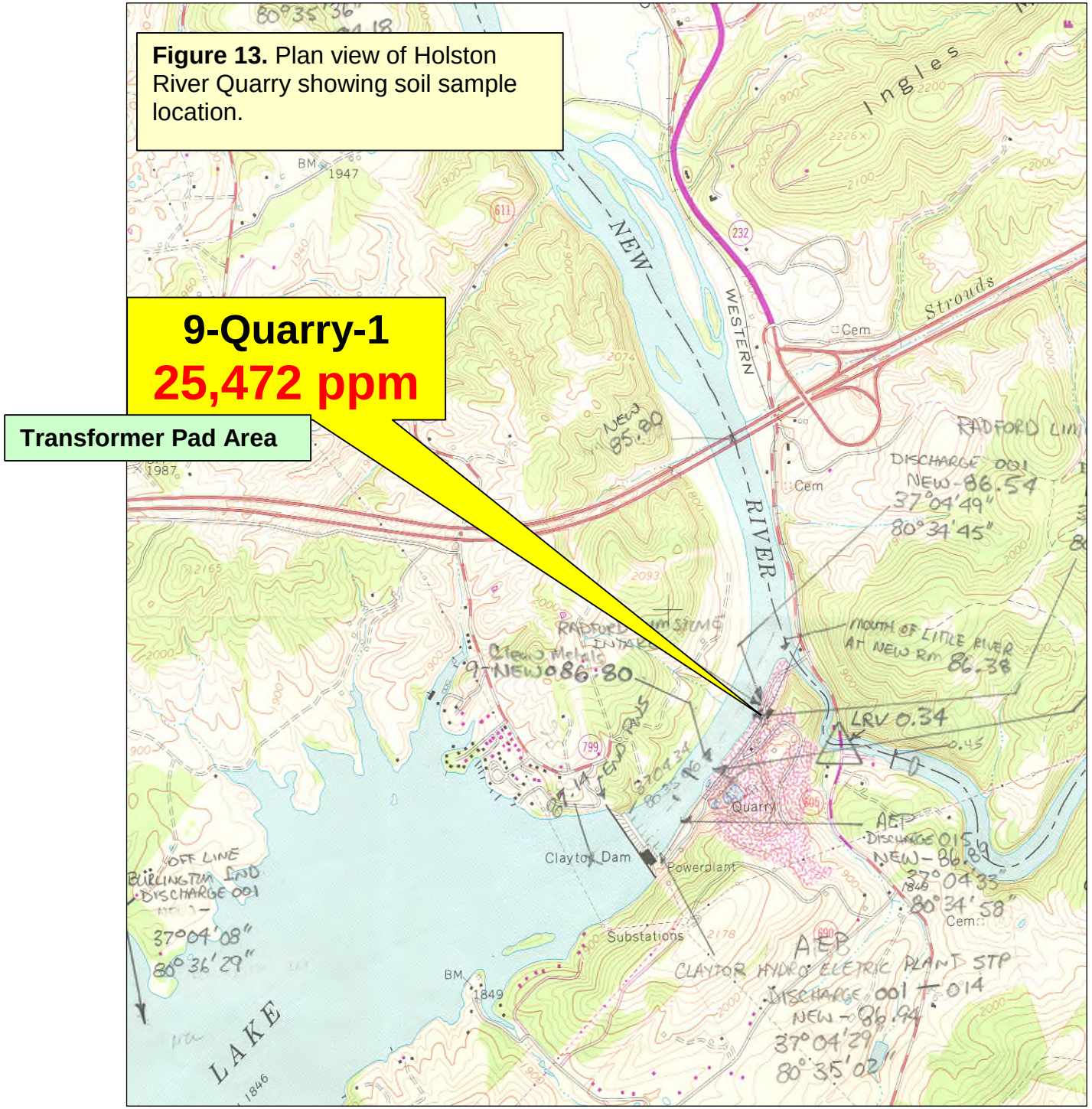



**Figure 13.** Plan view of Holston River Quarry showing soil sample location.

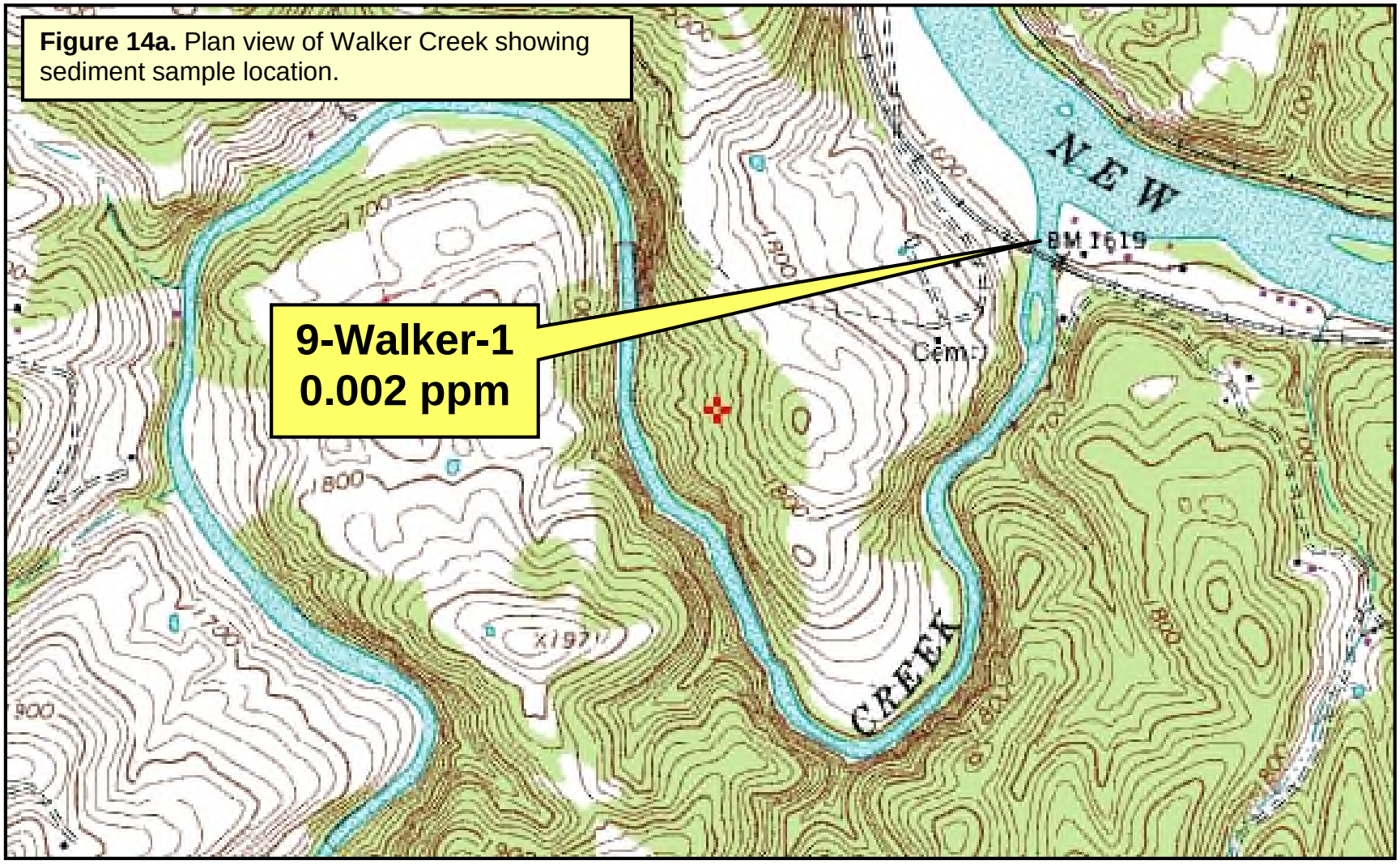


Figure 14a. Plan view of Walker Creek showing sediment sample location.
9-Walker-1
0.002 ppm
NEW
BM 1619
Cem.
CREEK
1700
1800
1900
2000

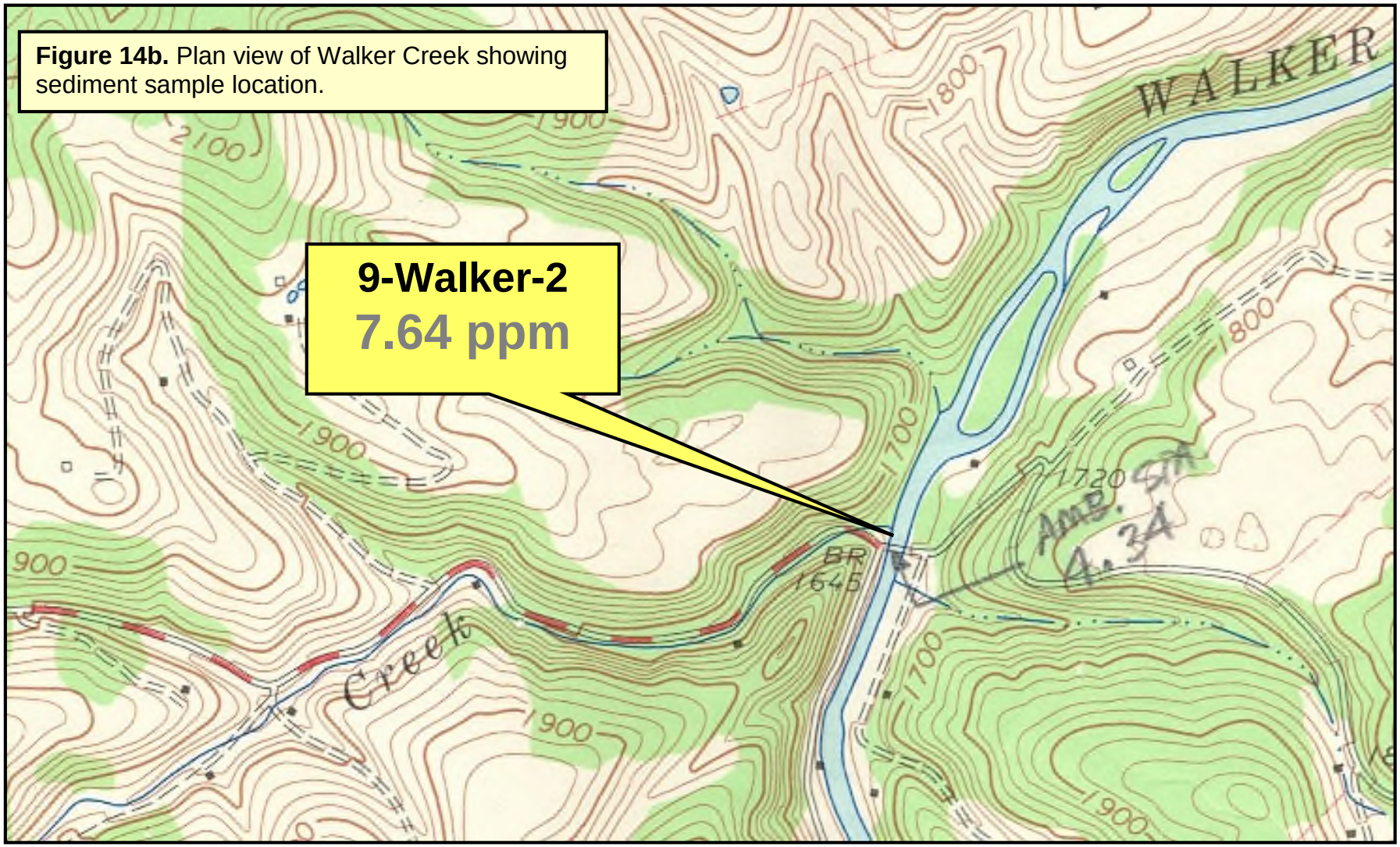



**Figure 14b.** Plan view of Walker Creek showing sediment sample location.

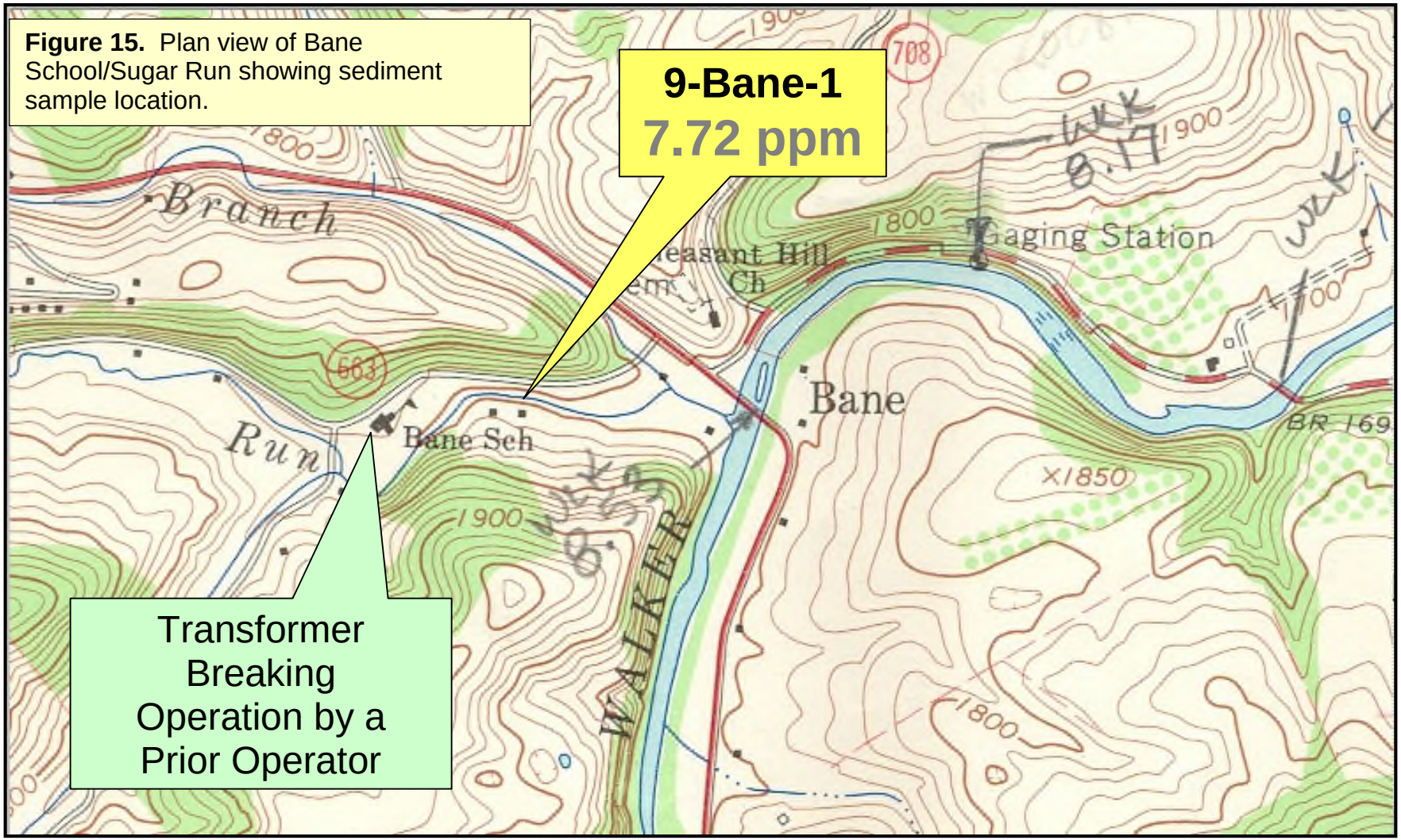



**Figure 15.** Plan view of Bane School/Sugar Run showing sediment sample location.

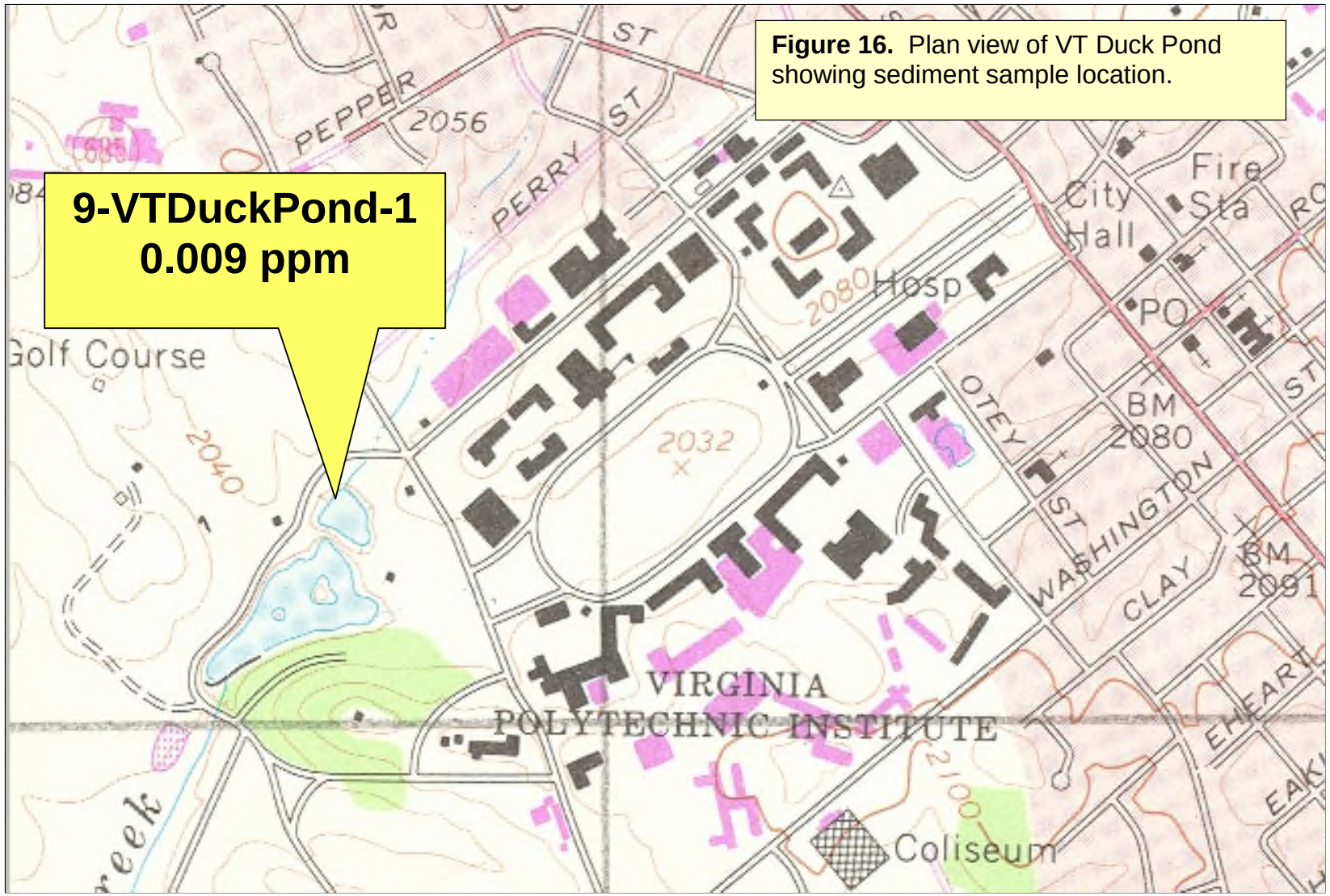



**Figure 16.** Plan view of VT Duck Pond showing sediment sample location.

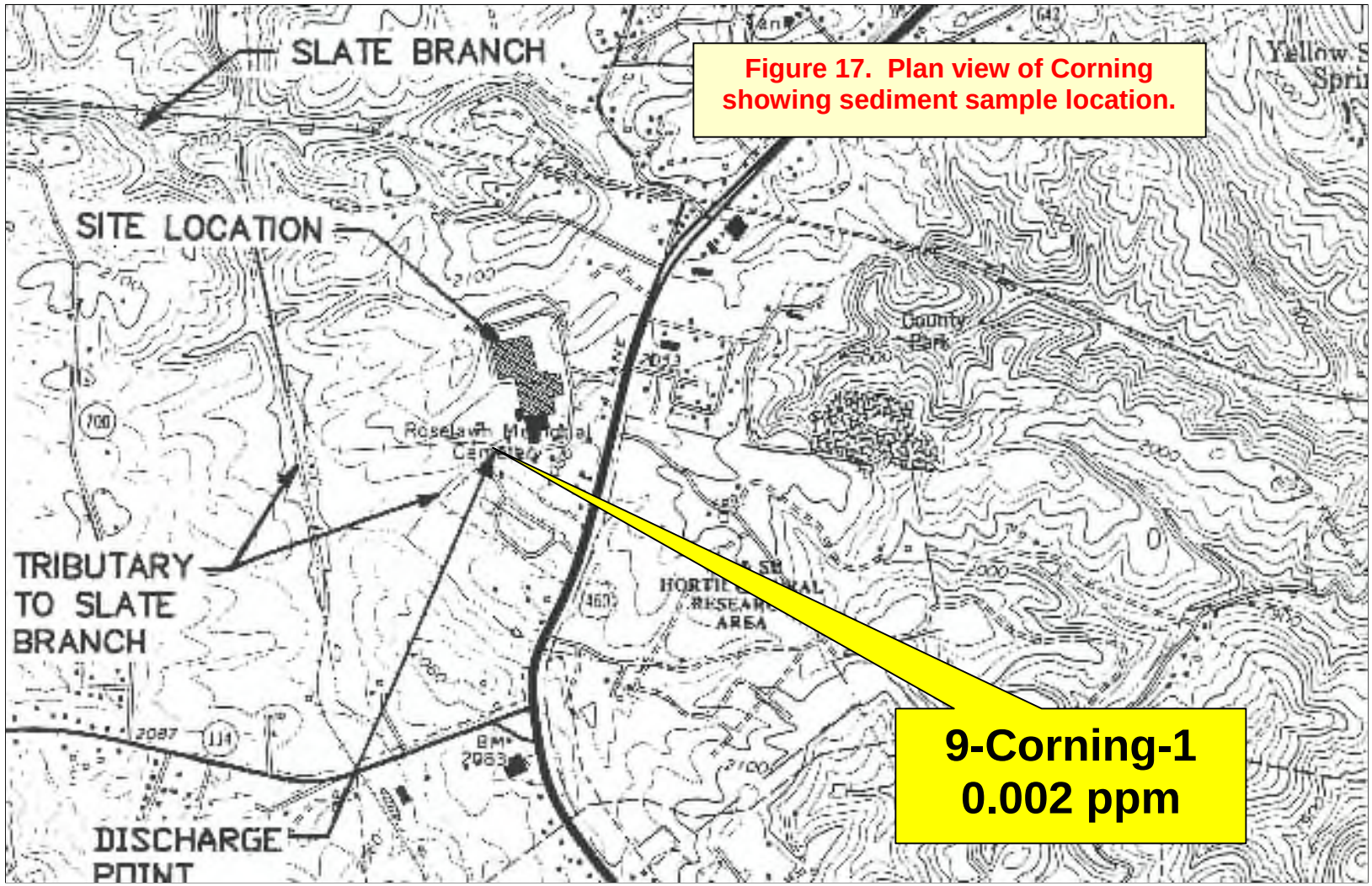



**Figure 17. Plan view of Corning showing sediment sample location.**

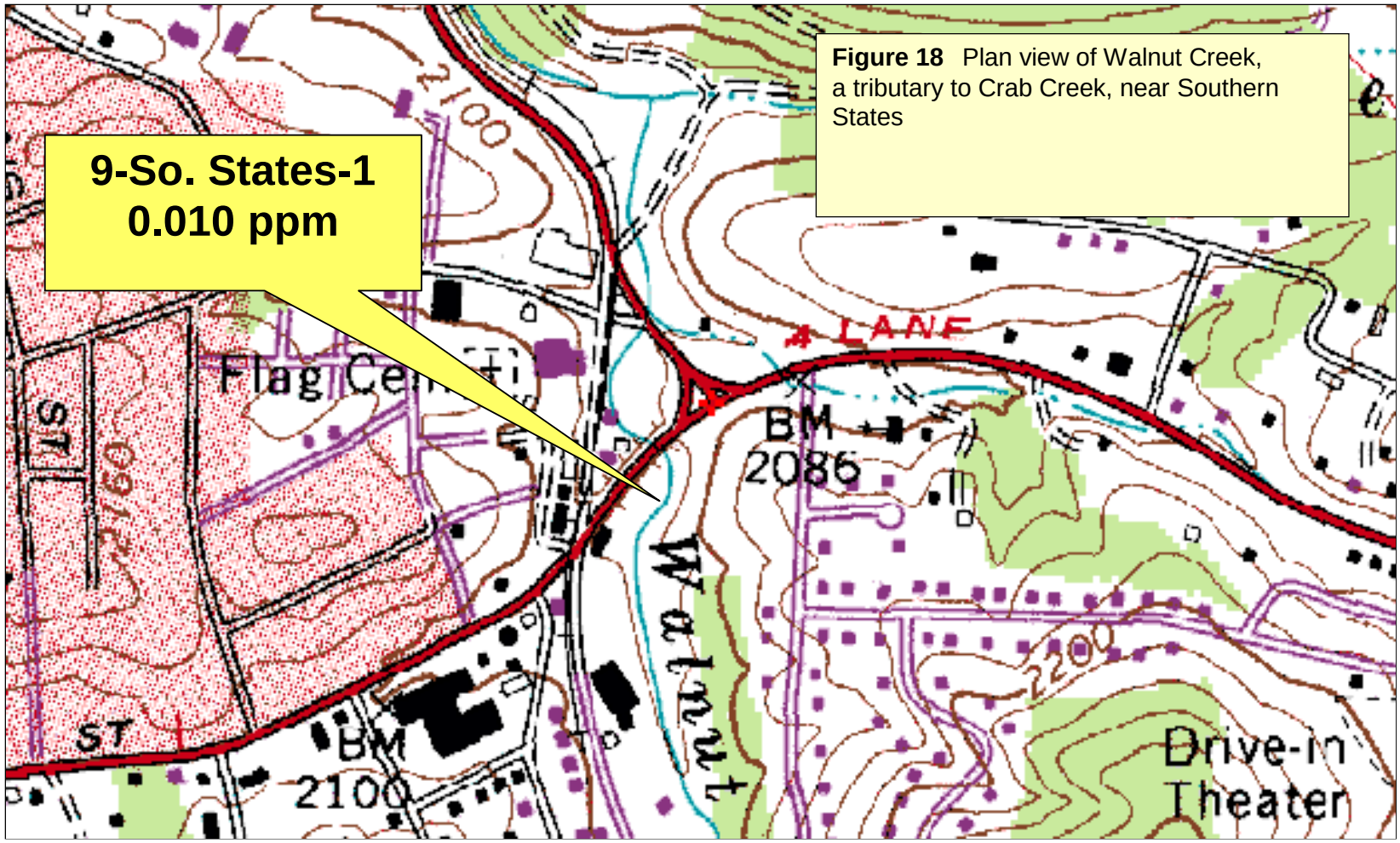



**Figure 18** Plan view of Walnut Creek, a tributary to Crab Creek, near Southern States

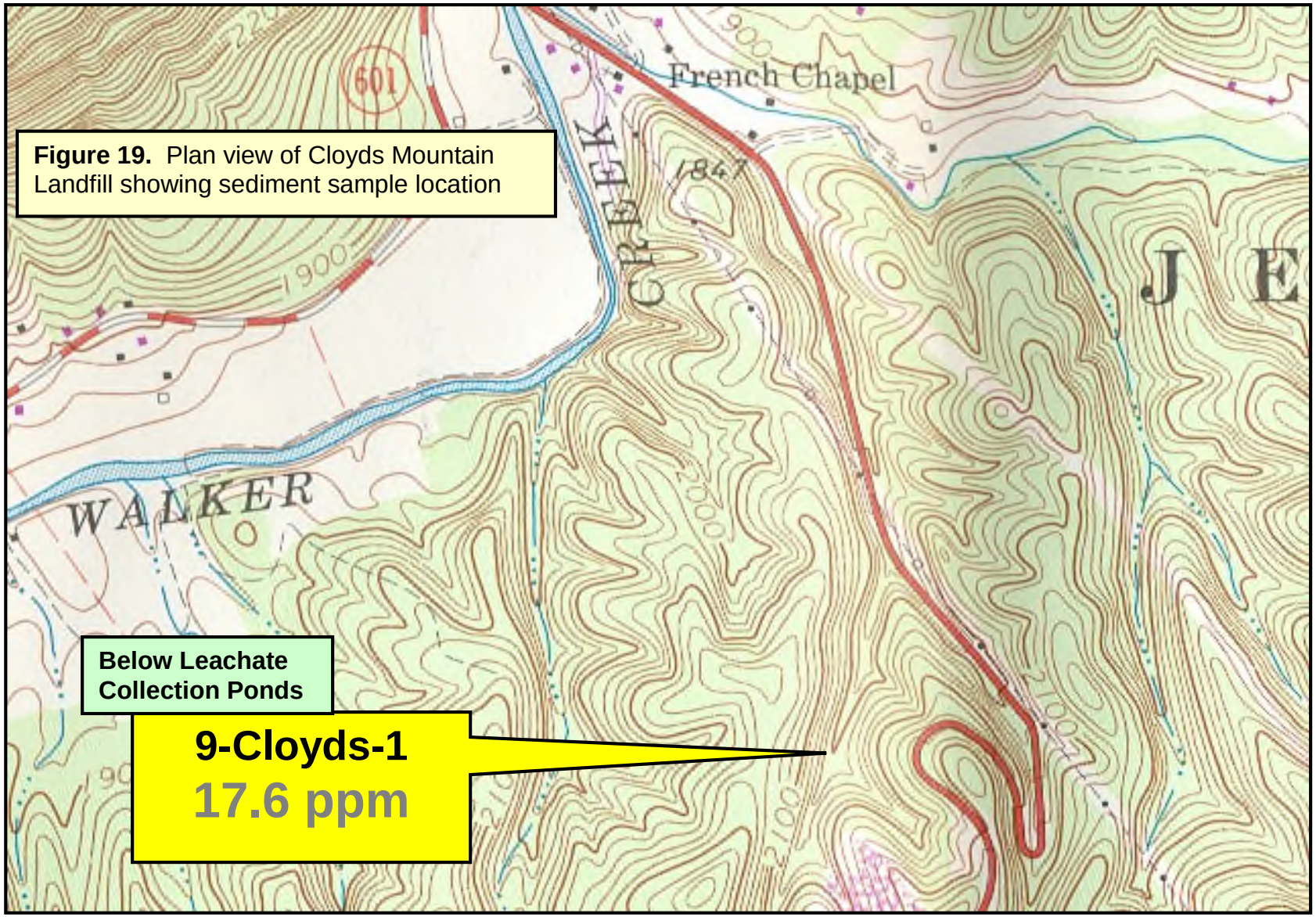



**Figure 19.** Plan view of Cloyds Mountain Landfill showing sediment sample location